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# **China Report**

**AGRICULTURE**

**No. 110**



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12 November 1980

## CHINA REPORT

## AGRICULTURE

No. 110

## CONTENTS

## I. GENERAL INFORMATION

## National

|                                                                                                                                         |    |
|-----------------------------------------------------------------------------------------------------------------------------------------|----|
| Country's Purchase of U.S. Grain Discussed<br>(Editorial; WEN WEI PO, 28 Oct 80) .....                                                  | 1  |
| Commentary Looks at Overcoming Droughts, Waterlogging,<br>Alkalinity<br>(GUANGMING RIBAO, 7 Aug 80) .....                               | 3  |
| Characteristics, Cultivation of New Rice Variety<br>(Zhang Duanquan, Yu Chengzu; NONGYE KEJI TONGXUN,<br>15 May 80) .....               | 6  |
| Further Improvements in Hybrid Rice Output Possible<br>(Lou Xizhi; NONGYE KEJI TONGXUN, 15 May 80) .....                                | 8  |
| Resistance of Paddy Rice Varieties To Different<br>Bacterial Strains Studied<br>(Wu Shangzhong, et al.; ZHIWUBAOHU XUEBAO, Mar 80) .... | 11 |
| Advantages of Using Plastic Sheeting on Plants Detailed<br>(NONGYE KEJI TONGXUN, 15 May 80) .....                                       | 18 |

## Fujian

|                                                                                                    |    |
|----------------------------------------------------------------------------------------------------|----|
| Scientist Who Discovered New Rice Virus Honored<br>(Chen Youren; GUANGMING RIBAO, 30 Jul 80) ..... | 21 |
|----------------------------------------------------------------------------------------------------|----|

## Hebei

|                                                                                                |    |
|------------------------------------------------------------------------------------------------|----|
| Commentary on Distribution Work in Drought Year<br>(Hebei Provincial Service, 16 Oct 80) ..... | 23 |
| Aquatic Product Resources Now Being Properly Managed<br>(GUANGMING RIBAO, 30 Jul 80) .....     | 25 |

|                                                                                                                                    |    |
|------------------------------------------------------------------------------------------------------------------------------------|----|
| Effectiveness of Spray for Gaoliang Demonstrated<br>(NONGYE KEJI TONGXUN, 15 May 80) .....                                         | 27 |
| <b>Heilongjiang</b>                                                                                                                |    |
| Briefs                                                                                                                             |    |
| Wasteland Reclamation .....                                                                                                        | 28 |
| <b>Hubei</b>                                                                                                                       |    |
| Grain Dryer Shortage, Molding Grain Reported<br>(Xu Baoguo, Chen Jianhua; RENMIN RIBAO, 29 Aug 80) ....                            | 29 |
| <b>Jiangsu</b>                                                                                                                     |    |
| Disaster Loans, Other Credits Granted Expeditiously<br>(Sun Ronghua; XINHUA RIBAO, 19 Aug 80) .....                                | 30 |
| <b>Shandong</b>                                                                                                                    |    |
| Reasons for High Output of Intercropped Corn Explained<br>(Guo Zhenxing, Wang Yuejuan; NONGYE KEJI TONGXUN,<br>15 May 80) .....    | 32 |
| <b>Shanxi</b>                                                                                                                      |    |
| Jincheng County Stresses Role of Agrotechnicians<br>(Ma Shunsheng; SHANXI RIBAO, 25 Aug 80) .....                                  | 34 |
| <b>Sichuan</b>                                                                                                                     |    |
| Soil Erosion in Sichuan Said Very Severe<br>(Liu Haifeng; GUANGMING RIBAO, 11 Aug 80) .....                                        | 36 |
| Neijiang Prefecture Strengthens Seed Production<br>of Hybrid Rice, Corn<br>(He Shouzhong, Shi Huagao; SICHUAN RIBAO, 16 Aug 80) .. | 38 |
| Animal Husbandry, Water Conservancy Plans Discussed<br>(SICHUAN RIBAO, 16 Aug 80) .....                                            | 40 |
| <b>Tianjin</b>                                                                                                                     |    |
| Vegetable Production, Supply Problems Discussed<br>(Han Qingyun; TIANJIN RIBAO, 18 Aug 80) .....                                   | 44 |
| <b>II. PUBLICATIONS</b>                                                                                                            |    |
| Table of Contents of 'NONGYE KEJI TONGXUN,' May 1980 .....                                                                         | 47 |

## ABSTRACTS

### GENETICS

YICHUAN XUEBAO [ACTA GENETICA SINICA], No 3, Sep 80 ..... 51

### PEDOLOGY

TURANG XUEBAO [ACTA PEDOLOGICA SINICA], No 3, Aug 80 ..... 57

### PLANT PROTECTION

ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA], No 3, Sep 80 ..... 65

1. GENERAL INFORMATION

COUNTRY'S PURCHASE OF U.S. GRAIN DISCUSSED

HK280307 Hong Kong WEN WEI PO in Chinese 28 Oct 80 p 2

[Editorial: "On the Sino-U.S. Grain Trade Agreement"]

[Text] China and the United States signed a grain trade agreement in Beijing on 22 October. By the terms of the agreement, the United States will sell China at least 24 million tons of wheat and corn in the next 4 years. According to U.S. officials, this agreement represents one of the largest deals ever negotiated by the United States, and will bring American farmers an annual income of about US\$1 billion.

This is not the first time China has bought grain from abroad, but it is the first time she has signed a long-term agreement of this kind with a foreign state for the purchase of such large quantities. Previously China bought grain mainly from Australia and Canada, yet today she turns to the United States; this cannot be compared with ordinary international trade, and is actually of far-reaching significance.

People have opined that by buying grain from the United States in this fashion China is as good as helping to get President Carter reelected, and certain U.S. congressmen have even attacked Carter on this point. We hold that it is really a bit onesided to look at this deal in this way. China has her reasons for buying such large quantities of grain from the United States instead of from other countries, but she is not aiming to influence the U.S. election.

As everyone knows, the United States has slapped a grain export embargo on the Soviet Union due to that country's invasion of Afghanistan. Previously, the United States sold a lot of grain to the Soviet Union, and now that this route is blocked, the interests of the grain farmers and laborers will naturally be affected. If the U.S. Government is forced to revoke the embargo on account of internal pressures, her opposition to Soviet aggression will be weakened, and strong dissatisfaction will be aroused among the grain farmers and laborers if no grain outlet is arranged. China has extended the hand of friendship to the United States precisely when the U.S. Government is confronted with these two difficult issues.

China's grain purchases are of course also aimed at relieving her own grain needs, but they are also aimed at strengthening the U.S. anti-hegemonist position and insuring that the United States will persist in her policy of embargoing grain exports to the Soviet Union.

Carter is the current president of the United States, and it is natural that he should sign a grain trade agreement with China. China, however, bases her vision on the overall situation and does her utmost to carry out her moral responsibilities for the good of Sino-U.S. interests. Unlike the U.S. Government, she will certainly not just consider temporary advantage or disadvantage, violate the spirit and stipulations of the Shanghai communique and the Sino-U.S. resumption of diplomatic relations, treat personnel from Taiwan as diplomats and sell military equipment to Taiwan. These actions of Carter do not conform to the interests of the people of the two countries, and naturally caused the Chinese Government to protest. China will absolutely not trade principles on the Taiwan issue. She can choose various ways of bringing about the return of Taiwan to the motherland; of course peaceful reunification is the best way. However, China will not lower herself to the same level and neglect grain trade; so she has despite everything signed an agreement that benefits Carter and the U.S. grain trade. China holds that opposition to Soviet aggression and expansion takes first place in world politics today.

Through the grain trade agreement signed by China and the United States, we hope that the United States will clearly understand China's stand: It is extremely important to uphold the interests of the two countries, and make common efforts to oppose Soviet hegemonism so as to safeguard world peace. The development of friendly relations between China and the United States will not tolerate hindrance from anyone. The signing of the Sino-U.S. grain trade agreement should not be devalued over the issue of who is to win the U.S. election. Wise men will be able to understand this very clearly.

CSO: 4007

## COMMENTARY LOOKS AT OVERCOMING DROUGHTS, WATERLOGGING, ALKALINITY

Beijing GUANGMING RIBAO in Chinese 7 Aug 80 p 1

[Article: "Only by Doing Things in Accordance With Objective Laws Can Drought, Waterlogging, Salinity, and Alkalinity Be Conquered"]

[Text] The plain of the Huang, the Huai and the Hai rivers covers an area totaling 300,000 square kilometers, with a cultivated area of 270 million mu, and a population close to 200 million. Here the resources in climate, soil, and water are extremely abundant. Historically, it has been China's foremost area of agricultural production. But over the years, as a result of the limitations of springtime drought, summertime waterlogging, and soil alkalinity and salinity, output has been low and inconsistent. In the 30 years since Liberation, though great changes have taken place in the face of the land here, still in the drought stricken, waterlogged, and alkaline areas, per mu yields of grain are only 200 to 300 jin, which is far below the national average. Consequently, bringing this region under control is not only an urgent demand of the broad masses of the people of the region, but is also of major significance in hastening the development of the modernization of China's agriculture.

How best to conquer drought, waterlogging, alkalinity and salinity so as to change with all possible speed the backward look of the Huand-Huai-Hai Plain? We may find an answer in the lessons of historical experience. During the 30 years since Liberation, although we have had many major successes in study in this regard and have accumulated quite a few experiences, we have also done quite a few things that have damaged the wealth of the working people, for which the lessons are rather deep. Between 1958 and 1961, in order to solve the irrigation problem quite a few areas blindly made diversion channels for the Yellow River, blocked rivers, and built dams in a major effort to build reservoirs on the plain. There was irrigation without drainage, which brought about secondary alkalization and salinization, or waterlogging. In the three provinces of Hebei, Shandong, and Henan, the area of alkaline and saline soil increased from the 28 million mu of the mid-1950's to 48 million mu. Following treatment of the alkaline and saline soil in these three provinces, the affected area declined to 21 million mu, after which some areas, when faced with drought, again blindly built diversion channels from the Yellow River for irrigation, and constructed sluice gates in watercourses to store water. The area affected by secondary alkalization and salinization again expanded to 28 million mu. This shows that in order to cure the drought, waterlogging, salinization and alkalization problems of the Huang-Huai-Hai Plain, things must be done in accordance with natural laws.

China's researchers have now gained important understanding of the laws and have scored major successes in bringing under control drought, waterlogging, salinization and alkalization. The formulation, in particular of a zoning plan for comprehensive control of drought, waterlogging, alkalization, and salinization in the Huang-Huai-Hai Plain has provided scientific data for our control of this region. The crux of whether this plan can be implemented in the future lies with every echelon of leadership of this region. In the past, the alkaline and saline soils in some places were not brought under good control or else the condition recurred several times, mostly because the leadership in those places contravened objective laws and blindly resorted to idealistic "blind direction." Secretary Zhang would come to dig a ditch only to have Secretary Li come along and fill in the ditch, with the expenditure of a great deal of money for no visible results. In order to avoid similar lessons and do things in accordance with objective laws, it is essential that leadership cadres on all echelons in this region master specific ways to control alkalinity, rapidly changing from greenhorns to experts. Facts have repeatedly shown that in instances where leadership cadres, and particularly the principal leadership cadres, have been able to master the knowledge pertinent to control of alkalinity or have been able to become experts in the control of alkalinity, it is in these regions that the old look will certainly take on new color.

In the conquest of drought, waterlogging, salinity and alkalinity in accordance with objective laws, of major importance is the need throughout for adherence to a correct direction for comprehensive control, because drought, waterlogging, salinity and alkalinity are interrelated and mutually restrictive. Sole reliance on engineering methods or biological methods is not likely to bring required results. Only by combining the two for comprehensive control with across-the-board development of agriculture, forestry, and livestock raising can good results in control and good economic results be attained. This requires doing a good job in the areas of agriculture, forestry, livestock raising, and water conservancy with coordination among several disciplines. If this is not done, it will not be possible completely to control drought, waterlogging, salinization and alkalization according to objective laws, and then water conservancy authorities will give attention only to engineering methods, and agricultural authorities will stress only biological methods in an erroneous tendency in which each is a law unto itself, which will finally lead to control work that is slight, slow, of poor quality, and expensive.

For the conquest of drought, waterlogging, salinity and alkalinity, a good job of management according to objective laws must also be done in a process whereby the control of each tract will be followed by development of each tract, and consolidation of each tract. Each jurisdiction will have to set up drainage systems, and rationally develop use of underground water, particularly of underground water just under the ground, strictly control the water table, adapt methods to local situations to handle the relationship among drainage, irrigation, and storage, institute complete and comprehensive technical management measures and establish both strict management systems and systems of responsibility. Additionally, it will be necessary to intensify dissemination of scientific knowledge about prevention and control of drought, waterlogging, alkalization, and salinization, and vigorously do a good job of training of grassroots level technical forces.

We believe that only if leadership cadres on every echelon and the masses living on the Huang-Huai-Hai Plain will prevent and control drought, waterlogging, salinization, and alkalization according to objective laws can this greatest plain in China become, in the not too distant future, a fully developed, rich and populous treasureland for agriculture, forestry, livestock raising, sideline occupations, and fisheries.

9432

CSO: 4007

## CHARACTERISTICS, CULTIVATION OF NEW RICE VARIETY

Beijing NONGYE KEJI TONGXUN [AGRICULTURAL SCIENCE AND TECHNOLOGY NEWSLETTER] in Chinese No 5, 15 May 80 p 2

[Article by Zhang Duanquan [1728 4551 3123] and Yu Chengzu [0060 21'0 4371], Xuzhou Prefectural Agricultural Institute, Jiangsu Province: "New Rice Variety--Xudao No 1"]

[Text] Xudao No 1 (name formerly used: irradiated early Ribenqing) was bred in 1974 by our institute following the irradiation of Ribenqing with gamma rays from cobalt 60. In evaluation experiments with summer rice performed in our institute in 1977, it showed a 9.4-percent increase in output over Ribenqing, and it ripened 8 days earlier as well. In combined experiments with medium-late geng varieties of rice conducted in 1978 on rice from northern ricegrowing areas (the Huang-Huai river ricegrowing area), average yields were 935 jin per mu, an increase of from 2.3 to 19.3 percent. Suburban areas of Xian have already begun to popularize its cultivation. In combined experiments conducted for 2 consecutive years in Xuzhou Prefecture on early-maturing intermediate geng rices, per unit yields averaged 835 jin, a rate of increase of from 7.3 to 21 percent. Communes and production brigades located near our institute are now planting it over a fairly wide area, and it has been acclaimed as a superior variety noted for its early maturing, short stems, bumper output, high grain-setting rate, and consistent output.

## Characteristics and Properties

Planted in summer, its total growth period is about 135 days, which is similar to that of Sidao No 4. It is suitable for rotational planting after wheat or green manure crops in the Huang-Huai area. [Its characteristics are:] strong tillering; plants fairly short, measuring about 95 centimeters in height; sturdy stems; fairly resistant to lodging; stronger resistance to bacterial blight than Sidao No 4; delicate growth; even panicle formation; stems green and grain yellow at full maturity; medium-size panicles; 65 grains per panicle; high grain-setting rate; about 25 to 26 grams per thousand weight of grain; superior quality rice; thin husks; rate of output of unpolished rice, 83.3 percent.

## Essentials of Cultivation

1. Inasmuch as its growth period is short, this rice is suitable for growing in rotation with wheat crops on large areas of fields with low fertility. Seeds are sown in mid-May; transplanting may be done in mid-June, when the seedling age is about 30 days. Sparse seeding and adequate fertilizer will produce strong seedlings.

2. As regards closeness of transplanted seedlings, this rice is suitable for close planting of its small plants in rows that are 5 cun apart, with plants being 3 cun apart. There should be 40,000 planting holes for each mu, with five or six seedlings planted in each hole. 3. There should be early application of tillering fertilizer to give the plants "a boost." Nitrogen should be withheld in midseason; when the number of stems and tillers total around 400,000 per mu, irrigation should be withheld until the field is baked dry, so as to prevent the rows from growing shut too early, leading to sheath and culm blight damage. About 20 days prior to the formation of panicles, panicle fertilizer should be applied, depending on the condition of the plants.

9432

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## FURTHER IMPROVEMENTS IN HYBRID RICE OUTPUT POSSIBLE

Beijing NONGYE KEJI TONGXUN (AGRICULTURAL SCIENCE AND TECHNOLOGY NEWSLETTER) in Chinese No 5, 15 May 80 p 3

[Article by Liu Xizhi (1236 1585 4363), Chinese Agricultural Institute: "Going a Step Further in the Farming of Hybrid Rice"]

[Text] As of 1979, hybrid rice was being cultivated on more than 76 million mu throughout China for an increased output of 7.8 billion jin of paddy, accounting for two-thirds of the total annual increase in grain production nationwide. During 1980, hybrid rice will find new development in additional areas. In order to increase further the output of hybrid rice, this article presents some views on adapting methods to local situations, sensibly selecting combinations for use, doing a good job of seed propagation, insuring the purity of hybrids, intensifying research in cultivation, and improving cultivation methods.

#### Adaptation of Methods to Local Situations and Sensible Selection of Combinations for Use

Combinations currently extended to production over wide areas are principally the male sterile lines of the wild aborted types Zhenshan 97, Erjiunan No 1, Wei 20, and Wei 41 in combination with restorer lines number 2, 3, and 6. Experience in production has shown that though these combinations have characteristics common to hybrid rice, each individual combination also has different strengths in accordance with the characteristics of their local climate, their farming system, soil fertility, and the incidence of diseases and insect pests, continually reaping fine harvests as a result. There are other individual places, however, that have not carried out experiments or demonstrations in advance, but have blindly extended cultivation of ill-advised combinations, incurring unnecessary losses as a result of which they have learned a hard lesson.

Following 3 years of regional testing nationwide, from which several quite good combinations were selected and approved, planting of these combinations as a late crop has begun in Hunan, Jiangxi, Fujian, and Zhejiang. Newly bred disease-resistant combinations such as Hunan's Tanlong No 4, Weiyou 35, and Weiyou 55 have undergone appraisal for ID-resistance characteristics, in which they have showed resistance to stem and yellow dwarf virus disease in the absence of treatment with chemicals and produced quite high output. They are now being widely propagated and test-planted in the Bimbo disease area. Hubei Province has combinations that are not sensitive to high heat and are resistant to yellow dwarf virus disease. Fujian Province has combinations resistant to leafhoppers, bacterial blight, and sheath and culm blight.

in the paddy ricegrowing areas of North China, several good combinations have resulted from regional testing and evaluation in production. In Liaoning, Beijing, Hebei, and Shaanxi, these combinations have demonstrated strong characteristics of high output, early ripening, and tolerance of cold. Newly bred early ripening combinations have shown definite heterosis in Hunan and Jiangxi, following regional testing.

#### Doing a Good Job of Seed Propagation and Preserving the Purity of Hybrids

Several years of experience have shown that the output quantity in seed propagation and, particularly, the quality of the output are the main links directly affecting increased production and the speed of development of hybrid rice. During the past 2 years a fairly large increase in output has taken place in seed propagation, but the increase is not balanced. The high has been 400 to 500 jin per mu, while the low has been only 20 to 30 jin per mu. Thanks to attention given by the leadership, a fairly perfect breeding and seed propagation system, a technical force and a place for breeding and seed propagation that has not been subject to changes, plus a series of rather complete procedures for stock seed production, and rules and regulations for technical operations involved in breeding and seed propagation, quite a few places have made very great increases in the quantity and quality of their breeding and seed propagation, thereby increasing the output derived from hybrid rice. There are also some places that have adopted a tier arrangement in their seed propagation work—for example, in some counties that have 1,500 mu of seed propagation fields scattered over more than 900 different sites, so that there is no need to be concerned about separation to prevent accidental hybridization, or about preservation of purity, or about increasingly serious adulteration and regression of hybrids. The adulteration rate is generally about 5 percent. When severe, it is from 40 to 50 percent. According to preliminary statistics from Hunan, for each 1 percent of decline in purity of the first generation of hybrid, harvests are smaller by about 10 jin per mu, and when the adulteration rate is more than 10 percent, having any heterosis is difficult, and reduced output may even result. Consequently, doing a good job of purification and rejuvenation work is a top priority matter. Unless this matter receives sufficiently careful attention, the development of hybrid rice may be impaired.

Purification and rejuvenation of hybrid rice and breeding and seed propagation are tasks with strong political, seasonal, and technical characteristics for which there must be a strengthening of leadership, a designation of responsible units, and the appointment of superior variety farms or agricultural institutes within the province or within prefectures that are responsible for purification and rejuvenation and for the supply of stock seeds. There must be continued propagandization and promotion in county seed propagation (or commune seed propagation), with centralization of breeding and seed propagation such as is appropriate to the different natural areas within a county. The object of purification must be combinations that have withstood the test of production over wide areas, that have strong heterosis, good resistance, broad adaptability, and future developmental prospects in the local area. The purification method should generally be the back-crossing of paired sterile lines and the test-crossing of paired restorer lines, thereafter making selections through a comparison of plant lines. The focus of purification must lie first of all in making sure of the purity of the sterile line, and secondarily of the purification of "three lines" that are linked, so that results will be better. Currently, the method of purifying the "three lines" is still fairly complex, requiring continued strengthening of research, study of experience, simplification of procedures, shortening of

time required, and early solution to the problems of adulteration and regression in some places. Those hybrids that have been seriously adulterated must be resolutely eliminated.

### Intensifying Research in Cultivation and Improving Cultivation Methods

Hybrid rice must possess the characteristics of strong tillering, well-developed root systems, luxuriant growth, sturdy stems, large panicles with numerous grains, a high rate of photosynthesis, strong metabolism, resistance to lodging, resistance to drought and tolerance of waterlogging, and broad adaptability. Whether or not these characteristics can produce increased output in production will be decided, to a very great degree, by sensible cultivation methods. Take reasonably close planting, for example. First of all, since in some places there is overreliance on tillering to form panicles, only a single plant is placed in each hole and tillering is 15- to 20-fold.

Lack of root development not only increases the quantity of tillering fertilizer used, but it makes keeping control over water and fertilizer very difficult, with attendant lack of greenness in plants and late ripening, an increase in the rate of small panicles, and a decline in the grain-setting rate. According to surveys, in most cases the number of panicles per mu has been around 150,000 for the past several years. The results of comparison of experiments in various places has shown that this number of panicles tends to be low. Over the past 2 years, every location has made the suitable increase in number of holes and the transplanting of an adequate number of basic seedlings the chief measure for assuring that the number of panicles will result in increased output of hybrid rice. Under most conditions today, for the early crop of hybrid rice each mu has from 20,000 to 25,000 holes, and from two to three seedlings are transplanted into each hole (including those great tillerers with three leaves). From 40,000 to 80,000 basic seedlings are planted per mu. For double-crop late rice, there are between 20,000 and 25,000 holes per mu, with from 80,000 to 120,000 (120,000) basic seedlings. About 3 jin of seeds per mu are required. Each locale has to be flexible, basing its actions on overall consideration of the fertility of local soil, use of light energy, different combinations, and level of cultivation. They must gradually accomplish a compatibility between the individual plants and the colonies, a correlation between the number of panicles and the number of grains, and a mutual coordination of main stems and tillers so that under different conditions, hybrid rice will form different high output colony structures.

Formerly, some places had problems as a result of cutting back on water too early, which was bad for the growth of roots and the extension of the functional time for the leaves. Preliminary study has demonstrated that hybrid rice requires less water than rice in general per jin of paddy produced, but the intensity of water requirements is quite large, with the disparity being greater following flowering. Fields must be baked only to the proper degree, and resumption of water must be prompt. The water management technique whereby water may not be deprived too early provides theoretical data. Factual examples demonstrate that hybrid rice-growing techniques in China have improved to varying degrees, but they await further improvement and perfection.

## RESISTANCE OF PADDY RICE VARIETIES TO DIFFERENT BACTERIAL STRAINS STUDIED

[Jan] in ZH(WUBAO) XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 1, Mar 80  
pp 41-47

Article by Wu Shangzhong [0124 1424 1813], Xu Xianming [1776 5029 2494],  
Lin Yungang [2651 6661 2646], Chen Fukun [7115 4395 0981], Cui Liqiang  
[1508 0300 1730], and Liu Jingmei [0491 2529 2734] of the Plant Life Preserva-  
tion Institute of the Guangdong Provincial Academy of Agricultural Sciences:  
"Resistant Reaction of Paddy Rice Varieties to Different Bacterial Strains of  
*Xanthomonas Oryzae* in Guangdong"

## [Text] Abstract

The resistant reaction of 46 varieties of paddy rice to 60 bacterial strains  
were determined. These varieties can be classified as type I, broad spectrum  
resistant, II, nonbroad spectrum resistant and III, nonresistant. Varieties of  
type I are mostly varieties introduced from other localities and their hybrid  
derivative varieties (lines). Only a few of the varieties of type II have better  
resistance; most of them are medium resistant or medium susceptible. All of the  
varieties of type III are susceptible but their characteristics for producing  
higher harvests are better. To breed more new varieties that are disease resis-  
tant, we believe varieties with a broad spectrum resistance should be selected  
as parents for combining with high yielding varieties. Also one to two strong  
bacterial strains should be selected and used to screen and select the resistant  
source or use the resistance of the offspring of hybrid combination to determine  
the bacterial strain to obtain satisfactory results.

Some of the new short stemmed varieties successfully bred by our province, such  
as "Zai ye qing No 8" planted at different areas showed different resistance.  
Also for example, "Zao jin feng No 5" has medium resistance in Guangdong but in  
the Hanzhong Prefecture in Shaanxi it is disease resistant. The varieties that  
originally were sensitive to the disease in Guangdong, such as "guang lu ai No 4"  
and "guang er ai" selected line showed disease resistance in the rice regions of  
the Changjiang River Valley. The results of the national regional evaluations  
of varieties showed that many varieties manifest different resistance and sensi-  
tivity to disease in different regions. Only "IR26" showed relatively uniform  
resistance. This situation reflects the possible existence of differences among  
the pathogenic lines of *Xanthomonas oryzae* at different regions. Ou Shihuang  
[2962 0017 3874]<sup>1</sup> studied the resistant reaction of 24 paddy rice varieties to

60 bacterial strains of *Xanthomonas oryzae*. Based on the results of such tests, he proposed a differentiation of resistance of the varieties into "broad spectrum resistance" and "nonbroad spectrum resistance." He also discovered different varieties can produce a reaction showing "an ability to recognize" or "no ability to recognize" the bacterial line. Facts show the resistance of the varieties to disease and the pathogenicity of the pathogenic bacteria and their variability are related. In recent years, research in this aspect has been conducted domestically and abroad.<sup>1,2,3,4,6</sup> We selected a total of 46 representatives of locally and provincially bred varieties and varieties introduced from abroad, used bacterial strains collected from 60 different regions and determined the resistance spectrum of the varieties to study and analyze the resistance of the varieties and the relationship between the pathogenic bacteria and their hosts and to seek out the varieties that can "recognize the bacterial lines" and that are suitable for planting in our province, and to improve and elevate the quality of the ways and methods of breeding disease resistant varieties.

## Material and Methods

### 1. Bacterial Strains for the Experiments

A total of 60 bacterial strains (including 33 leaf wilt types and 27 withering types of bacterial strains) were used. Of these, 24 bacterial strains came from 7 rice regions of continental China, Guangzhou, Foshan, Zhaoqing, Zhanjiang, Shaoguan, Huifang and Shantou, 24 bacterial strains from Hainan Island, 9 from Guangxi, 1 from Hainan, and 2 from Vietnam (See Table 1).

Table 1

| Number | Origin                                | Number | Origin              |
|--------|---------------------------------------|--------|---------------------|
| 001    | Xinshang, Nanhai                      | 023    | Yelin, Hainan       |
| 002    | Shilou, Panyu                         | 025    | Longguang, Hainan   |
| 003    | Dashi, Panyu                          | 026    | Cenxi, Guangxi      |
| 004    | Dagou, Yangjiang                      | 027    | Cenxi, Guangxi      |
| 005    | Liantan, Yunan                        | 028    | Yingzhou, Hainan    |
| 006    | Sacchu, Yunan                         | 029    | Yingzhou, Hainan    |
| 007    | Haozhu, Yunan                         | 030    | Yingzhou, Hainan    |
| 008    | Fusha, Zongshan                       | 031    | Hailing, Yangjiang  |
| 009    | Pingsha, Doumen                       | 032    | Wengcheng, Wengyuan |
| 010    | Dashi, Panyu                          | 033    | Maba, Qujiang       |
| 011    | Hingheng, Guangning                   | 034    | Tianyang, Guangxi   |
| 012    | Hainan Agricultural Science Institute | 035    | Beiliu, Guangxi     |
| 013    | Xinhui Agricultural Science Institute | 036    | Cenxi, Guangxi      |
| 014    | Liantan, Yunan                        | 037    | Cenxi, Guangxi      |
| 015    | Yaxian, Hainan                        | 038    | Beiliu, Guangxi     |
| 016    | Dongha, Yunan                         | 039    | Yanbu, Nanhai       |
| 017    | Longguang, Hainan                     | 044    | Yanbu, Nanhai       |
| 018    | Longguang, Hainan                     | 049    | Shilou, Panyu       |
| 019    | Longguang, Hainan                     | 051    | Beiliu, Guangxi     |
| 020    | Longguang, Hainan                     | 052    | Beiliu, Guangxi     |

[Table 1 (continued)]

| Number | Origin            | Number | Origin                |
|--------|-------------------|--------|-----------------------|
| 053    | Humen, Dongwan    | 064    | Chengdong, Hainan     |
| 054    | Zuojie, Hainan    | 065    | Chengdong, Hainan     |
| 055    | Juntian, Hainan   | 066    | Chengdong, Hainan     |
| 056    | Juntian, Hainan   | 067    | Chengdong, Hainan     |
| 057    | Juntian, Hainan   | 068    | Xiaodong, Vietnam     |
| 058    | Juntian, Hainan   | 069    | Xiaodong, Vietnam     |
| 059    | Juntian, Hainan   | 071    | Jiumenzai, Dongwan    |
| 060    | Juntian, Hainan   | 072    | Xintang, Fogang       |
| 061    | Juntian, Hainan   | 073    | Tiandu, Yaxian        |
| 062    | Chengdong, Hainan | 074    | Jinggangshan, Jiangxi |
| 063    | Chengdong, Hainan | 075    | Shantou               |

## 2. Varieties for the Experiment

Forty-six varieties were tested, including 12 varieties bred in our province, such as "zhai ye qing No 8," 3 local varieties such as "tang pu ai," 7 varieties bred outside of our province such as "3303," and 24 varieties introduced from abroad such as "IR2161." The names and origins of the varieties are listed in Table 2.

## 3. Method of Test

This experiment was conducted from July to October, 1978 in the large late rice fields at Shipai, Guangzhou. The rice field was disease free, dry and high and situated on the lee side. The above varieties were transplanted in the large field for testing. Each variety was planted in one row, one plant was planted in each hole, the row and plant distance was 8 x 5 shi cun. A protective row was planted on the four sides. Transplanting was done on 1 August, 35 days after transplanting (a total of 65 days with the addition of the seedbed period), the rice plants entered the young panicle differentiation period and inoculation was performed by hand by cutting the leaves. The first and second leaves at the tip of the plant were cut with a pair of disinfected scissors dipped into a solution of bacteria. Between 3 and 4 centimeters of the tip of the leaves were cut away. The scissors were dipped into the solution of bacteria every time they cut a leaf. The concentration of the solution of bacteria was 300 million bacteria/milliliter. Cutting the leaves and inoculation were carried out in late afternoon and early evening from 4 pm to 7 pm so that overnight dew kept the leaves moist after inoculation to prevent the cut from drying up and thus affecting the results of the experiments. Twenty to 25 days after inoculation, the length of the disease spots were measured and converted to a severity scale of six grades: highly resistant (HR), resistant (R), medium resistant (MR), medium susceptible (MS), susceptible (S) and highly susceptible (HS).

## Experimental results

1. The varieties were resistant to over 80 percent of the bacterial strains, the range of severity was from 0.1 to 3.1. There were 16 varieties that showed

Table 1  
Determination of the Spectrum of Disease Resistance of the Varieties  
(Resistance to 40 Bacterial Strains) 1978, 7-10, Shipai, Guangzhou

| No. | Name of Variety | Origin                           | Severity of Disease | Resistant        |              | Medium Resistant |              | Susceptible |              |
|-----|-----------------|----------------------------------|---------------------|------------------|--------------|------------------|--------------|-------------|--------------|
|     |                 |                                  |                     | Highly Resistant | (in percent) | Medium Resistant | (in percent) | Susceptible | (in percent) |
| 1   | 101             | Japan                            | HR                  | 100.00           |              |                  |              |             |              |
| 2   | 82161           | Philippines                      | HR-R                | 98.33            | 1.67         |                  |              |             |              |
| 3   | R. 101-312-9-3  | Philippines                      | HR-R                | 93.33            | 6.67         |                  |              |             |              |
| 4   | 101-312-9-3     | U.S.                             | HR-R                | 93.33            | 6.67         |                  |              |             |              |
| 5   | HR-70-1-1       | Introduced from other localities | HR-R                | 91.38            | 8.62         |                  |              |             |              |
| 6   | HR-71           | India                            | HR-R                | 86.47            | 13.53        |                  |              |             |              |
| 7   | 825             | Philippines                      | HR-R                | 64.41            | 35.59        |                  |              |             |              |
| 8   | 101-312         | Iran (Persia)                    | HR-R                | 81.67            | 18.33        | 3.33             |              |             |              |
| 9   | 101-312         | Philippines                      | HR-R                | 28.33            | 70.00        | 1.67             |              |             |              |
| 10  | 101-312         | Guangdong                        | HR-R                | 81.30            | 18.60        | 1.73             | 3.37         |             |              |
| 11  | 101-312         | Philippines                      | HR-R                | 73.33            | 26.67        | 1.67             | 1.67         |             |              |
| 12  | 101-312         | Philippines                      | HR-R                | 50.94            | 49.06        | 7.55             | 1.89         |             |              |
| 13  | 101-312         | Philippines                      | HR-R                | 68.33            | 31.67        | 1.67             | 3.33         | 1.67        |              |
| 14  | 825-3           | Philippines                      | HR-R                | 23.33            | 76.67        | 3.33             | 5.00         |             |              |
| 15  | 825-3           | Philippines                      | HR-R                | 7.95             | 92.05        | 13.72            | 9.80         |             |              |
| 16  | HR-71           | Guangdong                        | HR-R                | 61.67            | 38.33        | 3.33             | 1.67         | 5.00        |              |
| 17  | 101-312         | Fujian                           | HR-R                | 43.33            | 56.67        | 3.33             | 5.00         | 0           | 1.67         |
| 18  | 101-312         | Yunnan                           | HR-R                | 38.33            | 61.67        | 8.33             | 0            | 5.00        | 4.17         |
| 19  | 101-312         | Yunnan                           | HR-R                | 33.33            | 66.67        | 5.00             | 8.33         | 1.67        | 5.00         |
| 20  | 101-312         | Philippines                      | HR-R                | 28.33            | 71.67        | 15.00            | 10.00        | 6.66        | 13.33        |
| 21  | 101-312         | Guangdong                        | HR-R                | 15.00            | 85.00        | 21.67            | 10.00        | 3.33        | 8.33         |
| 22  | 101-312         | Guangdong                        | HR-R                | 5.00             | 95.00        | 38.33            | 25.00        | 8.33        | 21.66        |
| 23  | 101-312         | Philippines                      | HR-R                | 1.67             | 98.33        | 41.67            | 11.67        | 15.00       | 4.33         |
| 24  | 101-312         | Guangdong                        | R-R                 | 25.00            | 75.00        | 48.33            | 15.00        | 3.00        | 6.67         |
| 25  | 101-312         | Indonesia                        | R-R                 | 25.00            | 75.00        | 43.33            | 20.00        | 8.33        | 3.33         |
| 26  | 101-312         | Guangdong                        | R-R                 | 23.73            | 76.27        | 46.95            | 16.95        | 10.17       | 6.67         |
| 27  | 101-312         | Guangdong                        | R-R                 | 23.73            | 76.27        | 30.51            | 3.39         | 1.41        | 1.41         |
| 28  | 101-312         | Vietnam                          | R-R                 | 10.00            | 90.00        | 38.33            | 33.33        | 8.33        | 11.67        |
| 29  | 101-312         | Introduced from other localities | R-R                 | 18.97            | 81.03        | 29.31            | 3.37         | 1.37        | 1.37         |
| 30  | 101-312         | Guangdong                        | R-R                 | 8.33             | 91.67        | 46.67            | 18.33        | 8.33        | 8.33         |
| 31  | 101-312         | Guangdong                        | R-R                 | 11.86            | 88.14        | 30.51            | 18.64        | 11.96       | 11.96        |
| 32  | 101-312         | Philippines                      | R-R                 | 9.09             | 90.91        | 30.91            | 10.91        | 10.91       | 10.91        |
| 33  | 101-312         | Guangdong                        | R-R                 | 5.00             | 95.00        | 38.33            | 16.67        | 1.67        | 1.67         |
| 34  | 101-312         | Guangdong                        | R-R                 | 5.00             | 95.00        | 40.00            | 20.00        | 15.00       | 15.00        |
| 35  | 101-312         | Guangdong                        | R-R                 | 1.67             | 98.33        | 60.00            | 15.00        | 11.67       | 11.67        |
| 36  | 101-312         | India                            | R-R                 | 1.67             | 98.33        | 41.67            | 23.33        | 11.67       | 11.67        |
| 37  | 101-312         | U.S.                             | R-R                 | 1.75             | 98.25        | 29.82            | 31.58        | 31.58       | 31.58        |
| 38  | 101-312         | U.S.                             | R-R                 | 1.67             | 98.33        | 38.67            | 38.33        | 11.66       | 11.66        |
| 39  | 101-312         | Philippines                      | HR-R                |                  |              | 17.24            | 48.55        | 20.69       | 13.51        |
| 40  | 101-312         | Guangxi                          | HR-R                |                  |              | 5.00             | 48.33        | 26.67       | 20.00        |
| 41  | 101-312         | Chejiang                         | HR-R                |                  |              | 5.00             | 55.00        | 16.67       | 23.33        |
| 42  | 101-312         | Guangdong                        | HR-R                |                  |              | 3.33             | 26.67        | 28.33       | 41.67        |
| 43  | 101-312         | Guangdong                        | HR-R                |                  |              | 1.67             | 23.33        | 46.67       | 28.33        |
| 44  | 101-312         | Philippines                      | HR-R                |                  |              | 3.33             | 31.34        | 43.33       | 20.00        |
| 45  | 101-312         | Guangdong                        | HR-R                |                  |              |                  | 10.00        | 51.67       | 38.33        |
| 46  | 101-312         | Guangdong                        | HR-R                |                  |              |                  | 3.33         | 50.00       | 46.67        |

broad spectrum resistance, 12 of them showing a relatively strong resistance, "3303," "IR2161," "IR2061-552-6-9," "G.E 456," "VPR-70-3-7," "DV85," "IR26," "BG 35-2," "IR30," "Haqing 130," "IR36," and "IR32." The 4 varieties, "IR22," "IR1545," "IR28" and "Hai 42" were slightly susceptible to strong bacterial lines. The above varieties constituted the type I varieties and are broad spectrum resistant varieties.

2. Six varieties were resistant to over 50 percent of the bacterial strains, "lian xuan No 1," "1388," "74-105," "fei yin (076)," "zhongshan wu ming zhong" and "2150." These varieties showed a relatively good resistance. But the range of variation of the degree of severity was greater, indicating that their resistance is still not sufficiently stable.

3. Sixteen varieties were medium resistant to medium susceptible to over 60 percent of the bacterial strains. Their resistant reaction wavered between medium resistance and medium susceptibility and showed slightly susceptible reactions to strong bacterial strains. Of these, 7 were medium and slightly more resistant, "ai tang zu," "shu tian gu 4882," "zhai ye qing 8," "IR661," "fu hao ai 22," "BTO-MO-3-3," "tetep." Nine were medium and slightly susceptible, "tang pu ai," "zao jin feng 5," "IR24," "qiu er ai 1-3," "gui zhao 2," "er bai ai 1," "YQ22," "dwarf Zenith" and "Zenith (purple)." The above varieties are of type II and are medium resistant to medium susceptible varieties. The level of severity has a wide range of variation wavering between resistance and susceptibility, and when encountering strong bacterial lines, they are slightly susceptible to the disease.

4. Eight varieties were susceptible to most of the bacterial strains, "tadukang," "han tai ai," "9101," "guang er ai 5-3," "jin gang 30," "IR8," "zhen zhu ai 11" and "guang lu ai 4." These are of type III and are susceptible to highly susceptible varieties.

5. There were only 2 disease resistant varieties that were bred in our province, "hai qing 130" and Hai 42. The rest, "zhai ye qing 8," "ai tang zu," "fu hao ai 22," "zao jin feng 5," "qiu er ai 1-3," "gui zhao 2" and "er bai ai" were all medium resistant to medium susceptible and their reaction to strong bacterial lines was slightly susceptible. Therefore, these varieties manifested different resistance at different localities in our province.

#### Discussion and Conclusion

The results of inoculating 60 different bacterial strains in 46 paddy rice varieties showed the following resistant reactions: the varieties showed different levels of severity in their reaction to the disease depending upon the varieties' resistance to strong or weak pathogenicity and the pathogenic bacteria. This is basically the same as the conclusion reached by Ou Shihuang.

The results of the experiment pointed out that the resistance of the varieties can be classified into three types, broad spectrum resistance, nonbroad spectrum resistance and nonresistance. Type I varieties have a relatively stable disease resistance and it is more ideal to utilize their resistance. Type II

varieties have unstable resistance. They are easily affected by strong bacterial lines. Type III varieties have no resistance. But their economic characteristics for producing bumper harvests are better. Therefore, how to solve this conflict between resistance and high yield is an important question worth studying in future breeding of disease resistance.

Regarding the ability of the varieties to recognize different bacterial lines, types I and III seem to be insensitive to most of the bacterial lines. They can all be considered as varieties "not having the ability to recognize" bacterial strains. Type II varieties are varieties that "have the ability to recognize" bacterial strains. Based on actual need, varieties with different resistance can be selected as determinant varieties in the study of bacterial lines.

In the selective breeding of disease resistant varieties, this experiment has pointed out that most varieties introduced from places outside the province and the varieties (lines) bred from these varieties all have a broad spectrum resistance while our province's local varieties or their hybrid disease resistant varieties generally have a narrower resistant spectrum. It can thus be seen that in the screening and selection and the evaluation of resistance to *Xanthomonas oryzae* of paddy rice varieties and in obtaining varieties with a broad spectrum resistance, bacterial strains with strong pathogenicity must be selected as a screening and selection device to screen and select only those truly highly resistant varieties.

In the selection of parents of resistance source, the disease resistant varieties bred in our province in the past have all been hybrid combinations of medium resistant to medium susceptible local or introduced varieties such as "tang pu ai," "2160," "zhai ye qing No 8," "bao tai ai," "IR661," "IR24," and "shui tian gu 4882" as one parent coupled with susceptible varieties such as "guang er ai No 5," "188," "zhen zhu ai" and "guang lu ai No 4." Therefore, the resistance spectrum of these parents are all relatively limited, and the varieties bred from them also approximate their ancestors. To elevate the quality and level of our province's breeding of disease resistance, we believe that when considering the unification of disease resistance and bumper harvest characteristics, varieties with a broad spectrum of disease resistance should be selected as a parent for coupling with a variety that has superior bumper harvest characteristics and a broad adaptability. Resistance can be induced through hybridization and selection to obtain even more satisfactory results.

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9296

CSO: 4007

## ADVANTAGES OF USING PLASTIC SHEETING ON PLANTS DETAILED

Beijing NONGYE KEJI TONGXUN [AGRICULTURAL SCIENCE AND TECHNOLOGY NEWSLETTER] in Chinese No 5. 15 May 80 p 15

[Article by Vegetable Research Institute, Chinese Agricultural Academy (Based on Collation of Data from the Dalian Conference): "Farming in 1979 With Plastic Sheeting Ground Cover"]

[Excerpt] Use of plastic sheeting to cover the ground when planting (hereafter simply called ground sheeting) is a protective cultivation method that has been in wide use for many years in foreign countries. In a certain sense it may be said to be a kind of "root protection cultivation." Japan is the first country to study it and put it to use. During the mid-1960's, we Chinese used ordinary plastic sheeting to conduct experiments on small areas and obtained definitely beneficial results. The Ministry of Agriculture formally introduced this technique in 1978, and 1979 saw its experimental promotion to fairly large areas. In October of the same year, the Ministry of Agriculture convened a special conference to summarize and exchange experiences and to give further impetus to the development of this new technique. Experience has demonstrated that ground sheeting can promote early ripening and increased output of many kinds of crops at low cost, simply and easily. It should be rapidly studied and promoted in China's broad regions.

## 1. Synopsis of Experiments

Experiments were conducted last year in 14 provinces and municipalities in the north-east, North China, the northwest, and some prefectures in the south. A total of 47 institutes and teaching units as well as 185 production units conducted experiments using ground sheeting with 40 different vegetables, grains, and oil crops on an area totaling 660 mu. In every area, careful measurements and studies were made of the changes in environmental conditions beneath the ground sheeting; the effect of these changes on the growth, development, and increased output of the crops; the growing techniques used with ground sheeting; and the machines and tools used with ground sheeting. They also worked together with plastics industry departments to test-manufacture the sheeting; they evaluated and approved for use as a ground cover the transparent, colorless, polystyrene plastic sheeting. This plastic sheeting has a thickness of from 0.015 to 0.02 millimeters, and it approximates or attains the level of quality of Japanese products. Currently, plastics plants are producing it in batch processes at Changsha, Beijing, Luda, and Haerbin. Each mu requires from 7 to 10 kilograms of it, at a cost of from 25 to 35 yuan.

## 11. Effects on Growth and Development of Crops

1. Promotion of the growth and development of crops: Observations at all locales have showed that in vegetable production, the height of the plants, the thickness of the plant stems, the degree of development, the leaf area and the numbers of leaves, the number of blooms and number of fruits, and the sizes of the fruit were all greater in ground-sheeting areas compared with nonsheeted areas (hereinafter termed simply the control). Root system development was greatly strengthened. Under most conditions, sprouting occurred from 2 to 10 days earlier when the covering was used. The rate of development increased from 0.1 to 1 times, and leaf areas increased by from 15 to 100 percent. Aboveground fresh weight of vegetables increased by from 0.5 to 2 times, with roots increasing their length by one to three times. Fruity vegetables squared, flowered, and set fruit 3 to 19 days earlier. During the early period of crop growth, the fruit-setting rate and the increase in the pistillate flowers' growth rate were even more striking. As a result, the fruiting and ripening stage was advanced some 5 to 20 days.

Similar results were also obtained in cultivation using ground sheeting for rice, peanuts, cotton, corn, and soybeans.

2. Increased output: Figures on more than 120 vegetables with which ground sheeting was tested showed that, with the exception of ginger and a decrease of 5.8 percent in output of one kind of cabbage at one test site, there was a general increase in output of from 2.5 to 309 percent. About 80 percent of the vegetables showed an increased output of more than 30 percent. In Liaoning and Heilongjiang provinces, rather great increases in of peanut output were harvested through the use of ground sheeting. The Luda Municipal Agricultural Institute had legume yields of from 626.7 to 726.7 jin per mu, an increase of from 39.7 to 62.6 percent over the control. Paddy rice yields at the Jilin Municipal Paddy Rice Institute and in Yichun Prefecture, Heilongjiang Province, showed an increase of from 16 to 201 percent over the controls, and increased output of early rice amounted to between 29.1 and 90.9 percent. Ground sheeting has provided a new path for rice production in places where the frostfree period is short, early spring temperatures are low, and there is a lack of water.

3. Improved quality of output: Ground sheeting can improve the quality of vegetables produced. A survey in Shanxi Province showed a 100-percent rate for first- and second-quality asparagus lettuce grown with ground sheeting, while the third-quality rate for the control was 20.6 percent. The Northeast Agricultural Academy has reported good coloring of tomatoes and cucumbers, and an increase of from 4.7 to 15.7 percent over the control in the solubility of solids. Tomatoes grown with ground sheeting by the Shandong Agricultural Academy had increases of 22 to 33 percent in their pulp content, and 44.5 to 50 percent increase in the amount of vitamin C.

4. Strength of crop resistance: Ground sheeting can reduce damage from diseases and insect pests. Tests have show that the incidence of downy mildew in cucumbers was reduced 16 to 52.5 percent, and the disease index declined 0.61 to 5.83 percent. Additionally, diseases such as mianyibing [4875 4004 4016] in eggplant and dubing [3021 4016] in sweet peppers and hong [5725] beans were less severe. There were, however, cases in which wilt in cucumbers and purpura haemorrhagica in onions was more severe; further experimentation and testing will be required in the future. One of the reasons for the crops' intensified resistance to disease is that the growth of plants is healthier following the use of ground sheeting. Another reason is that the air humidity in the protected area can be reduced by from 3 to 7 percent (Liaoning

Province), thus restricting the development of disease bacteria. A survey in Jilin Province showed that when sweet peppers were grown with ground sheeting, a decrease of 80 percent occurred in the numbers of aphids. Reportedly, this was because the plastic sheeting increased the reflectance of short light waves, causing the aphids to be repelled. Tests conducted by the Gansu Agricultural Academy showed that ground sheeting can reduce the damage done to young tomato plants by early spring frost by as much as 50.2 percent. In this regard, we have given attention to a Soviet research report of many years ago. This report said that air temperatures at ground cover surfaces in early spring are lower than air temperatures at the surface of the soil, so that when frost comes, it forms more readily on such surfaces, and this increases the danger from sudden cold. It must be explained that they used paper as ground sheeting, and it is possible that the benefits from paper are not entirely the same as those from plastic. Further testing and study are necessary. Experiments in Japan have demonstrated that the use of ground sheeting during the "frostfree period" can advance the growth period.

9432

CSO: 4007

## SCIENTIST WHO DISCOVERED NEW RICE VIRUS HONORED

Beijing GUANGMING RIBAO in Chinese 30 Jul 80 p 1

[Article by Chen Youren [7115 2589 0088]: "Rice Virus Disease, Cuaibing, Discovered Through Penetrating Investigation and Research by Fujian Agricultural Academy Lecturer Xie Lianhui"]

[Text] Fujian Agricultural Academy lecturer Xie Lianhui [6200 5114 6540] has discovered a new rice virus disease, cuaibing [4663 4253 4016], and he has also found a way to prevent and control this disease. His discovery has added a new variety of disease to those rice virus diseases already known in the world, and has made a contribution to research in rice virus diseases which has aroused the attention of academic circles both at home and abroad. This success recently earned him the Award First Class of the Fujian Provincial People's Government for 1979.

In 1969, Xie Lianhui was transferred to manual labor in the countryside at Ganmutang in Ninghua County. While helping the masses control rice blast, he discovered a strange sickly plant in the fields. It was stunted, grew like grass, and produced panicles that were not firm and grains that were not heavy. It posed a very serious threat to paddy rice output, and was given the name rice cancer. Because conditions were lacking at the time, the disease was not classified. In 1972, while Xie Lianhui was writing some teaching materials on agricultural plant pathology, he felt a keen lack of firsthand materials on virus diseases in rice, and he and some other teachers, together with several students, undertook a survey of virus diseases in rice throughout the province, again discovering the same kind of sickly plants. They undertook contagion experiments with the sickly plants, and sent some to the authorities concerned for sectional [microscopic] observation. It was verified that this was a new kind of virus disease in rice, and was given the name cuaibing. Following authentication by Qiu Weifan [5941 4850 5603], a professor at Beijing Agricultural University, and by professors at the Fujian Agricultural Academy, this was deemed a new virus disease of rice heretofore undiscovered elsewhere in the world, the discovery of which was of major significance both from a theoretical and a production standpoint.

Following discovery of this virus disease in rice, Xie Lianhui and the others continued to explore the laws governing its occurrence and the ways to prevent and control it. While continuing to do a good job of teaching, they frequently set off for northern Fujian, western Fujian, and southern Fujian to look into

the situation regarding cuaibing, and to introduce people to means of preventing and controlling it. Once numerous communes and production brigades had accepted their recommendations and carried out control measures, the development and spread of cuaibing promptly halted. During the past several years, Xie Lianhui and the others have been writing dissertations on research into paddy rice cuaibing; these have been published in ZHIWU BINGLI XUEBAO (PLANT PATHOLOGY BULLETIN) and ZHONGGUO NONGYE KEXUE (CHINESE AGRICULTURAL SCIENCE). The deputy director of the China Plant Protection Society Qiu Weifan, who is China's famous plant pathologist, last year attended the ninth meeting of the World Plant Protection Society Conference in Washington, D.C., where he outlined the successes achieved in this research work. In November 1979, in a special academic report titled "Study of Paddy Rice Virology," prepared as the result of a visit to Fujian Province by famed virologist Dr Lin Ke Zhi (phonetic) of the International Rice Institute in the Philippine Islands, full affirmation was given to cuaibing as a new virus disease and to the new contribution to world research on rice viruses. The British PLANT PATHOLOGY REVIEW excerpted for publication the title and contents of Xie Lianhui's research paper on cuaibing.

#432

CSO: 4007

COMMENTARY ON DISTRIBUTION WORK IN DROUGHT YEAR

HK250738 Shijiazhuang Hebei Provincial Service in Mandarin 0430 GMT 16 Oct 80

[Station commentary: "Carry Out Distribution According to Work and Look After Those in Need"]

[Excerpts] Due to serious drought this year, some areas of Hebei have suffered a relatively great decline in grain production. However, there have been relatively great increases in cotton and oil-bearing crop production. Income from diversification and from the commune and brigade enterprises has exceeded that of last year. The total agricultural income will not be lower than last year, and may be slightly higher. This particular circumstance of reduced harvest without reduced income brings new contents to the yearend distribution.

On the other hand, due to the universal implementation this year of the responsibility system linking remuneration to output, it is necessary to make good the rewards and fines in accordance with the regulations. In grain ration distribution, we have gradually expanded the proportion made up from distribution according to labor in the past 2 years. Last year the proportion on the majority of production teams was seven for the number of people to three for labor. This year the majority of teams have instituted six for the number of people and four for labor, or else fifty-fifty. A few teams have also instituted the method of distribution according to labor plus special care for those in need. Thus, the issue of how to better implement the policy of distribution according to work in this year's distribution work and also take care of households in difficulties such as dependents of martyrs and servicemen, "five-guarantee" households, households with many members but few laborers, and dependents of workers and cadres has become a question that must be solved properly.

This year most of the industrial crops tended by the peasants on a contract basis have exceeded their output quotas, in some cases by very large margins. Very many items of industrial and sideline production have also overfulfilled the targets. In this case, so long as the majority of peasants hold that it is rational, we should persistently fulfill the distribution commitments, to facilitate the stabilization of policies and gain the people's trust. Suitable readjustments after discussion by the peasants can be made in certain places where production quotas were set too low on

account of inexperience and distribution commitments would indeed be irrational. However, the matter must be democratically discussed and everyone must agree. It must not be decided by just a few people. In cases where most work groups or peasants could not fulfill the set targets despite hard work, on account of serious natural disasters, the targets can be readjusted, after peasant discussions, to bring them into line with the "disaster" standard.

There are great difficulties and complex circumstances in this year's distribution work, and the task has a strong sense of policy. Leading cadres at all levels should go down to the basic levels to investigate and study, dissect sparrows, and grasp the experiences of points to guide work over areas. Through carrying out meticulous and deepgoing work, they should get a good grasp of the task, so as to protect and further mobilize the peasants' enthusiasm for production and lay the foundation for winning a bumper harvest next year.

CSU: 4007

# AQUATIC PRODUCT RESOURCES NOW BEING PROPERLY MANAGED

Beijing GUANGMING RIBAO in Chinese 30 Jul 80 p 2

[Article: "Hebei Intensifies Aquatic Product Resources Breeding and Protection Work"]

[Text] During the first half of this year, the total output of aquatic products in Hebei Province showed an 18.9-percent increase over the same period last year, and a 24-percent increase in the quantity purchased by the state. At the present time, aquatic products coldstorage lockers in the cities of Shijiazhuang, Baoding, Cangzhou, Tangshan, and Qinhuangdao are filled with fresh fish. A supply is available for the urban people; this is a change in the situation that had existed for many years, when fish was difficult to obtain.

To the east of Hebei Province is the Bohai, where aquatic product resources are extremely plentiful. There are more than 600,000 mu of ports and harbors, shallow beach areas, and saltpan pools, as well as 1.2 million mu of reservoirs, pools, and ponds, all of which can be used for the raising and breeding of aquatic products. During the 1950's the maximum annual output of aquatic products for the entire province amounted to more than 124,000 tons. During the past 10 years and more, however, aquatic product resources suffered severe damage, and a great decline took place in the output of the fishing industry as a result of inattention to the breeding and protection of aquatic product resources.

In order to change this state of affairs, Hebei Province last year diligently carried out the spirit of the All-China Aquatic Products Conference and the regulations of the State Council pertaining to the breeding and protection of aquatic product resources, combining these with realities to make specific regulations regarding the standards for catches of major aquatic animals, areas closed to fishing and seasons prohibited to fishing, the fishing tackle and fishing methods employed, and the prevention of pollution to oceans and rivers. In addition, provincial, county, municipal, and inland units located on large bodies of water set up administrative organizations for the breeding and protection of aquatic product resources, adopted vigorous measures, issued fishing industry licenses to fishing boats engaged in fishing industry production, and instituted a ban on and an elimination of nets and fishing methods that destroy resources. As a result of the adoption of these measures, a striking turn for the better took place in the orderliness of fishing industry production in this province. Gangnan Reservoir, located in Pinghan County, is the largest reservoir in all

of Hebei Province, with a water surface of 580,000 mu for raising fish. As a result of the lack of management, indiscriminate fishing, wanton blasting of fish, and poaching which had endured for a long time in the past without solution, annual fish yields per mu of water surface were only 6 or 7 jin. This year there was established a government fishing office, combining specialized management with management by the masses. Each commune and brigade in the area of the reservoir set up fishing industry management units, restructured the system for fishing boats entering the reservoir to engage in production, and brought to book a gang of five thieves who had stolen nets and poached fish on several occasions with damage to the production of the fishing industry, thereby bringing about striking changes for the better in the orderliness of production of the fishing industry at the reservoir. By the end of June, they had already fulfilled their quota of 120,000 jin for the state, in completion of 85 percent of their part of the state plan for the entire year.

Simultaneous with the intensification of breeding and protection work for aquatic products, Hebei Province has also paid attention to the development of both ocean and freshwater breeding. At 14 places throughout the province, commodity fishing industry bases have been set up, with a water surface for breeding totaling more than 80,000 mu. In addition to the breeding that is being done by state-owned and collective enterprises, the families of commune members have also begun to develop fish breeding.

432  
CSO 4067

# EFFECTIVENESS OF SPRAY FOR GAOLIANG DEMONSTRATED

Beijing NONGYE KEJI TONGXUN [AGRICULTURAL SCIENCE AND TECHNOLOGY NEWSLETTER] in Chinese No 5, 15 May 80 p 13

[Article by Funing County Scientific Committee Corn and Gaoliang Unit for the Coordination of Key Tasks, Hebei Province: "Spraying Gaoliang To Create Dwarfing and Strengthening"]

[Text] The ingredient used to spray Gaoliang so as to dwarf and strengthen it was first put to use by the Agricultural Techniques Station of Shahezhai Commune in our county. Experiments at numerous sites and demonstrations on large areas throughout the county during the past 5 years have demonstrated its outstanding effectiveness. A total of 16 controlled experiments during the past 5 years have all demonstrated increased output. The lowest increase in output was 7.57 percent, and the highest was 55.8 percent. Large area demonstrations at Shahe Commune showed a general increase in output of about 120 jin per mu.

The chief manifestations following spraying with the dwarfing and strengthening ingredient (comparison made with a control) were: a 32-centimeter decrease in plant heights; a 4-millimeter thickening of the stems; a shortening of the spiking stem by 7.2 centimeters, and a 19.6-gram increase in grain wheat. The foregoing are average values for the 2 years 1977 and 1978 from a single demonstration at 12 different sites. In addition, as a result of spraying with the dwarfing and strengthening ingredient, leaves at every test site became wider, thicker, and of deeper color. A survey taken at a farm of the Niutouya Production Brigade showed that sprayed plants had a total of 78 root strands, 29 more than on the control plant, for an increase of 59.2 percent in the number of roots. Spraying of the dwarfing and strengthening ingredient also reduced the aborting of flowerlets and promoted early ripening. Spraying of the dwarfing and strengthening ingredient at 100 times regular strength during the period of jointing (8 to 9 leaves), with the spraying being done three times, brought best results. But spraying three times is both a waste of work and a waste of the chemicals, while changes in output are minimal. Consequently, spraying once or twice usually is sufficient. If spraying is to be done twice, there should be an interval of 5 to 7 days before the second spraying.

## HEILONGJIANG

### BRIEFS

WASTELAND RECLAMATION--Heihe Prefecture, Heilongjiang Province, has rationally reclaimed and utilized wastelands. It has since 1974 reclaimed 1.72 million mu of wasteland, establishing 18 communes, 2 reclamation areas and 300 production teams. [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 23 Sep 80]

CSO: 4007

## GRAIN DRYER SHORTAGE, MOLDING GRAIN REPORTED

Beijing RENMIN RIBAO in Chinese 29 Aug 80 p 2

[Article by Xu Baoguo [1776 0202 0948] and Chen Jianhua [7115 1696 5478],  
Xinshou County Broadcasting Station, Hubei: "Rural Villages Lack Dryers"]

[Text] During June and July of this year, it was cloudy and rainy for days on end in our county. It rained almost twice as much as during the same period in most years. Because of a lack of drying equipment, the threshed wheat piled in warehouses began to mold seriously. According to statistics from the grain authorities, about 27.3 million jin of wheat throughout the county molded. Of this total 3.64 million jin was more than 25 percent moldy, and 1.05 million jin was unfit for consumption. Summer grain output by the Jiebu Production Brigade of Yangluo Commune amounted to 103,000 jin, all of which molded, and not even seeds were left. The fruits earned through sweat and toil were gained only to be lost. This really made people feel sympathetic!

Fields in our county cover an area totaling 820,000 mu, but there is not a single piece of drying equipment. Whether or not the grain can be brought safely into warehouses depends entirely on the favor of heaven.

It is hoped that the authorities concerned will give a great deal of study to the manufacture of durable drying equipment that can use a broad range of energy sources (including natural energy sources such as wind power and methane gas) so as to help the broad masses of farmers have bumper harvests.

9432

CSO: 4007

## DISASTER LOANS, OTHER CREDITS GRANTED EXPEDITIOUSLY

Nanjing XINHUA RIBAO in Chinese 19 Aug 80 p 1

[Article by Sun Ronghua [1327 2837 5478]: "Emphasis on Support to Communes and Production Brigades in Rural Villages in Combating Calamities and Reaping Bumper Harvests; Agricultural Banks Everywhere Grant Credits Promptly"]

[Text] For a long time, agricultural banks everywhere in Jiangsu Province have been promptly extending large-scale credit to those areas where rain has caused calamitous flooding so as to help communes and production brigades combat the calamity and reap bumper harvests. In the month of July alone, agricultural production loans amounting to 109.55 million yuan were made throughout the province to help production teams solve their difficulties in getting capital for replanting and fertilizing, for combating flood waters and waterlogging, for controlling insects and preventing diseases, and for increasing drainage and irrigation facilities.

In addition to giving support to the development of agricultural production, agricultural banks everywhere also adapted methods to local situations for the vigorous promotion of comprehensive development by communes and production brigades of agricultural sideline production. Throughout the province, a total of 1,544,766,000 yuan in industrial loans, a 2.7-fold increase over the same period last year have been granted to solve problems that old enterprises have in finding circulating capital for production, and [to make available the] capital for additional construction or new construction and equipment needed by the light industry and building materials industries. Attention has also been given to helping enterprises improve their administration and management, to getting rid of idle and overstocked goods and the unreasonable tieup of capital, and to effecting production changeovers to goods that will sell well. Agricultural banks in Shazhou County have emphasized support to eight textile mills for production of high-quality manufactures, causing the output value of these enterprises during the first 6 months of this year to increase by 112 percent over the same period last year, and profits to increase by 148 percent. Dacang County agricultural banks have granted a total of 11,299,000 yuan in loans to impel commune and production brigade enterprises to follow the road of integration. Currently there are 43 commune and production brigade integrated enterprises in the county. In Wuxi County, attention has been given to helping production teams develop collective sideline industries and commune member household industries. This year a 4.7-fold increase has taken place in the issuance of sideline industry loans over the same period last year.

In order to emphasize support to Xu, Huai, and Yan prefectures, the Provincial Agricultural Bank has set aside 50 million yuan as special loans for the support of production of commodity goods. The recipients of the loans and the items for which loans are to be granted have already been substantially decided upon, and loans are continuously being made. As of the end of July this year, the accumulated amount of agricultural loans made for all purposes throughout the province totaled 2,249,350,000 yuan, exceeding the volume of loans granted for all of last year by 58.9 percent.

9432

CSO: 4007

## REASONS FOR HIGH OUTPUT OF INTERCROPPED CORN EXPLAINED

Beijing NONGYE KEJI TONGXUN [AGRICULTURAL SCIENCE AND TECHNOLOGY NEWSLETTER] in Chinese No 5, 15 May 80 p 12

[Article by Guo Zhenxing [6753 2182 5281] and Wang Yuejuan [3769 2588 1227], Agricultural Techniques Station, Rushanzhai Commune, Rushan County, Shandong Province; "Reasons for Increased Output From Intercropping of Wheat With Corn on "2-4 Plots," and Management Measures"]

[Excerpt] The intercropping of wheat and corn on "2-4 plots" means that wheat plots are 4 chi wide and 2 chi deep. One month before the wheat is harvested, two rows of corn are intercropped along the back of the plot. Our commune has been using this cultivation method ever since 1973, and in 1977 it became commonly used throughout the commune. Along with development of "2-4 plots" has come a year-by-year increase in corn output. Average yields per mu were as follows: 764 jin in 1974; 550 jin in 1977; 674 jin in 1979. Additionally, inasmuch as "2-4 plots" of corn can be cleared early and wheat planted, this has also played a definite role in promoting wheat output.

## Reasons for Increased Output

In addition to the increased output potential of late ripening corn varieties resulting from the lengthened growing period that is permitted by direct early sowing, the main reason for increased output from "2-4 plots" is that "2-4 plots" are suited to the characteristics of the local climate. During June, the quantity of rainfall is usually slight and the climate dry, which is just what the corn seedlings in the "2-4 plots" need so that their growth will be restrained while their roots develop. Corn sown in summer is sown during the first 10 days of July, just in time for the seedlings to come up in the rainy season, and frequently because of waterlogging of the sprouts, normal growth and development are impaired. When the corn is intercropped, however, by that time the cornstalks are beginning to become cylindrical (with 11 leaves visible), and the staminate tassel has reached the stage of differentiation of the earlet, when the quantity of water required gradually increases, and when it has rather strong tolerance against waterlogging. As a result, consistently high output results from the intercropped corn.

The time of maximum need for water for the corn in the "2-4 plots" is from the flaring period until the in-milk period (mid-July to late August), which also happens to be the high water season when rainfall is at its maximum, with an average rainfall most years of about 380 millimeters. Corn directly planted in summer has its period from flaring to in-milk delayed until from early August until mid-September, during which time the quantity of rainfall most years is about 280 millimeters. Thus it

may be seen that corn grown in "2-4 plots" has its period of critical need for water just at the time when there is the greatest amount of rainfall. This is the second reason for the consistent output of corn from "2-4 plots."

Between the earing period and the in-milk period, corn requires high temperatures. In the "2-4 plots," corn begins to form ears during late July, just at the season for high temperatures. As a result, the milk formation proceeds very quickly and the weight of kernels increases. By contrast, multiple-cropped corn just begins to ear in mid-August, and frequently climatic warmth is inadequate by the in-milk stage. Formation of the milk proceeds slowly, with impaired kernel weight and a decline in output. This is the third reason for the consistently high output of corn from "2-4 plots."

9432

CSO: 4007

## JINCHENG COUNTY STRESSES ROLE OF AGROTECHNICIANS

Taiyuan SHANXI RIBAO in Chinese 25 Aug 80 p 2

[Article by Ma Shunsheng [7456 7311 0581]: "Jincheng County Agrotechnicians Achieve Success in Promotional Work; Strengthen the Building of Scientific and Technical Corps; Turn Agroscientists to Best Advantage"]

[Text] Jincheng County has given serious attention to the building of a corps of agricultural scientists and technicians and has made fullest use of its agrosience and technical personnel, thereby enlivening scientific and technical work in agriculture and achieving outstanding successes.

Jincheng County is a large county with varied topography and a complex macroclimate, which particularly needs large numbers of agroscientists and technicians to guide the entire county's scientific farming, adapting methods to local situations. Consequently, all echelons of leadership throughout the county are extremely attentive to the building of an agrosience organization and an agrosience corps. Currently, 404 of the 672 production brigades in the county are operating agrosience corps, and an overwhelming majority of production teams have from one to three agricultural technicians, seed personnel, or plant protection personnel. Throughout the county, the three tier agrosience organization of communes, production brigades, and production teams have a total of more than 7340 peasant technicians. This corps has become an advisory body for the leadership, and a mainstay in scientific farming that has made contributions to agricultural production as follows: 1) Adaption of methods to local situations to promote knowledge of agricultural techniques to bring about a general increase in the level of scientific farming. This county has suffered for many years from drought and lack of rainfall. The agrosience personnel took account of this situation to change the system of farming for corn, wheat, and millet. Throughout the county, they promoted large area intercropping of spring millet with wheat. This kind of millet tolerates dryness and the plants continue to grow. It is suitable for cultivation on drylands, and per mu yields have averaged 300 jin over the years. In the farming of corn, a change was made from irrigation ditches in fields, to furrows, with the cultivation of large and small rows. From this single item alone, the county saved more than 1.13 million man-days each year, and increased grain output by more than 10 million jin. 2) Substantially controlled outbreaks of common crop diseases and insect pests. Adhering to a program of "prevention is paramount, and comprehensive prevention and control," the agrosience personnel have brought under substantial control gaoliang aphids, armyworms, jinhuaichong [6855 5363 5722] in rape, snout moth's

larva in cereal grains, red spiders in wheat, downy mildew of millet, and red leaf disease [4767 5509 4016] in persimmon trees. The control area amounts to 75.8 percent of the total grain field area. 3) Principal crop varieties have been converted to superior varieties. Propagation of superior varieties by county and commune bases is done through specialized production in accordance with a regional plan. Last year the area in which superior varieties of all kinds were grown throughout the county amounted to more than 67,700 mu. Superior variety bases were located in 67 places, and all wheat and cotton grown has been converted to superior varieties. The area planted to superior varieties of corn, gaoliang, and pulses is more than 90 percent of the total. 4) A general soil survey was conducted, and soil throughout the county was virtually completely typed. Last year, a quick check was made on the nitrogen, potassium, and phosphorus content of more than 600,000 mu of cultivated land in order to provide scientific data on the rational use of soil resources.

The main reason for the continuous strengthening and development of the Jincheng agroscience corps and for the large role it plays in production is that all levels of the Party organization did a solid job of solving some real problems existing in the agroscience corps, and particularly in the commune agroscience stations.

One was concern for the personal welfare of personnel at agroscience stations. Comrades at the commune agroscience stations are all farmers from production brigades who have a difficult situation, great amounts of work to do, receive no wages, and who have a daily expense in paying for board with peasant families. Consequently, it was necessary to make some reasonable arrangements about remuneration for their labor and their living difficulties. In order to solve this problem, in places where communes were doing a good job of running enterprises, the agroscience stations instituted a wage system paid for out of income earned by commune operated enterprises. In places where economic conditions were poor, a method supplementing work points recorded was worked out with supplemental living allowances coming from income earned by commune operated enterprises and from the agroscience stations' seed operations. Commune agroscience station personnel got grain to eat from a revolving grain store. During their period in the countryside, grain departments supplied grain in fixed amounts. Second was constant restructuring of the organization, recruiting for agroscience stations those comrades who were extremely fond of agricultural science and technology, and transferring to other positions those who were not suitable for work in agricultural science and technology. They also gave attention to keeping people in place as much as possible once assigned. Third was intensification of the building of professionalism and increasing technical levels. During the past 2 years, in addition to its participation in prefectural training, the entire county has organized more than 10 specialized training sessions of various kinds, and during last year alone, the county and the communes ran programs to teach and train more than 450,000 persons in technology, and printed more than 3000 pieces of technical data for distribution. The entire county has been divided into six separate technical promotion grids for regular technical exchanges, with learning from the strong points to some to offset the weaknesses of others for the common elevation of all. At the present time, more than 40 of the 151 personnel at agroscience stations have attained a medium skill level, and more than 80 personnel have attained an elementary skill level, and a large number of peasant technical personnel have also sprung up.

## SOIL EROSION IN SICHUAN SAID VERY SEVERE

Beijing GUANGMING RIBAO in Chinese 11 Aug 80 p 2

[Article by Liu Haifeng (0491 3189 1496), Water Protection Department, Gansu Provincial Water Conservancy Bureau: "Information About Soil Erosion in Sichuan"]

[Text] Recently I had opportunity to return to my own village in Sichuan Province. When I saw that soil erosion there was becoming increasingly serious, I felt deeply disturbed. Authorities concerned in Sichuan Province have compiled statistics showing that a decrease in volume of flow has occurred in the Min River, the Jialing River, the Tuo River, and the Fu River as a result of soil erosion, while a great increase in silt has taken place. A comparison of the volume of flow of the Min River during the 1970's with the 1950's shows an average decrease of more than 2.2 billion square meters, while the amount of silt from erosion has increased by 1.5 million cubic meters. When I visited Wanshan Prefecture located in the Daba mountain system, it just happened to rain for several days in a row, and all along my route torrents of water rushed down mountains, and rivers roiled. During 1970 and 1971, on-the-ground measurements were taken of a moderately eroded watercourse in this prefecture, which showed that annual erosion of silt averaged 1.59 million tons, i.e. each square kilometer lost 706 tons of silt to erosion annually. By extension, every year at least 220 million tons of silt would be eroded from the 44 million mu of land in the entire prefecture.

Comrades responsible for rural village work in the Wanxian Prefecture Party Committee told me very worriedly that in quite a few places, each time it rains hard, giant stones and trees weighing several thousand jin are swept away. The water catchments and hydropower stations here are silting up extremely seriously and will have to be abandoned after less than 20 years of use. The "Rocket" reservoir in the Wanxian watershed area has a storage capacity of 200,000 cubic meters, and it became entirely silted up within 7 to 8 years time and had to be abandoned. The local masses said that "the rocket has gone to the heavens!" The Xiao River hydroelectric power station reservoir in Yunyang County has a storage capacity of 720,000 cubic meters. In 1975, it began to impound water, and now silt has filled one-third of its storage capacity. A comrade in charge at the Tangjiao District CCP Committee in Yunyang County reported that the major reason for this state of affairs is that in their quest for greater grain production during the past several years, some people opened to cultivation slopes with 60 to 70 degree grades, so that the soil on these slopes was entirely

washed away. Furthermore, random cultivation of odd plots here and there and the cutting of timber is still fairly universal here. Forests destroyed during the past several years in Wanxian Prefecture in order to grow tea amounts to between 300,000 and 400,000 mu, and even now some cases of the destruction of forests have not yet been promptly handled. Despite such severe erosion in Sichuan Province, there are no people especially responsible for looking after the problem. Nowhere in the province is there an organization for the management of water and soil conservation. Our weakening and destruction of water and soil conservation activities for many years has created seriously disastrous effects. Is it possible that we should not have learned this lesson today?

9432

CSO: 4007

## NEIJANG PREFECTURE STRENGTHENS SEED PRODUCTION OF HYBRID RICE, CORN

Chengdu SICHUAN RIBAO in Chinese 16 Aug 80 p 1

[Article by He Shouzhong [6320 1343 4545], Prefectural CCP Committee News Unit, and Shi Huagao [4258 0553 7559], newspaper correspondent: "In Order to Provide More and Better Sources of Seeds To Make Use of Hybrid Heterosis, Neijiang Prefecture Intensifies Construction of Seed Bases for Greatly Increased Output of Hybrid Rice and Hybrid Corn Seeds"]

[Text] Even while propagating and promoting hybrid varieties, Neijang Prefecture's seed authorities have constantly intensified the construction of seed bases. In recent years a great increase has taken place in the output of hybrid rice and hybrid corn seed propagation and the quality has improved for an increase in agricultural output.

Several years ago, when Neijang Prefecture began to expand its propagation of hybrid rice and hybrid corn seeds, a production team might work several mu of land in widely scattered places for seed propagation with the result that neither cadres nor commune members would give them sufficient attention, and authorities responsible for seeds could not easily provide technical guidance. Consequently output was low, quality poor, and the propagation and extension of the cultivation of superior varieties proceeded slowly. Following a summary of the lessons of experience by agricultural and seed units at the prefectural and county levels in 1978, a group of seed bases were built one after another to bring about centralized propagation of seeds. Each county and municipality designated a Revolutionary Committee chairman or secretary in charge of agriculture, as well as an agricultural bureau chief and a seed station chief to do the actual work. Additionally, they dispatched more than 100 cadre versed in agricultural technology to enlist a group of peasant technicians to provide technical guidance. Through these means, both the area of seed propagation and average per unit yields more than doubled. Last year, they further summarized experiences and intensified the construction of seed bases. They consolidated the former more than 200 rice seed propagation communes into 54, and average yields of somewhat more than 50 jin per unit of area in 1978 rose to 122 jin. The number of communes engaged in the propagation of corn seeds was also consolidated 110, versus the former more than 90, and average per unit yields of somewhat more than 140 jin rose to 172 jin. The quality of superior hybrid varieties also improved to provide the conditions for the extension of cultivation of hybrid rice and hybrid corn throughout the prefecture. Last year, the area planted to hybrid rice throughout the prefecture

amounted to one third the total area planted to rice. This year that area was expanded to two-thirds. The area sown to hybrid corn amounts to more than 90 percent of the total corn area.

This year, in response to new developments in its work, the prefecture seed authorities have further intensified construction of seed bases. Counties with high average per unit yields from seed propagation produced more than 160 jin per unit yields; those with low yields had only somewhat more than 80 jin. Communes and brigades with low yields derived few benefits, and their enthusiasm for doing a good job of running bases waned to get into seed propagation. The prefectural seed company analyzed some of the reasons why commune and brigade yields were low in the propagation of seeds and intensified technical guidance in practical ways. They proposed suitable increases in the number of basic seedlings of the female parent, an increase in the margin for coincidence of flowering seasons, restraint in the quantity of nitrogenous fertilizer used, and increased application of organic fertilizer combined with applications of phosphate and potash fertilizers to promote increased output from the propagation of seeds. Additionally, in view of improvements in seed propagation technology and increased output during the past several years and in conformity with the principles of profits for communes and brigades engaged in seed propagation, economic accounting by communes and brigades using the seeds, and no losses for the state, the rate of exchange between seeds and grain was readjusted from the former 1 to 10 and above to no more than 1 to 10. In Leshi, Anyue and Ziyang counties, as well as in parts of Jiayang County where drought is frequent, the frequent "moving" of seed bases impaired consolidation of the seed bases. The prefectural seed authorities proposed to the authorities concerned that arrangements be made for some capital to be taken from county soil improvement and water conservancy funds and that additional gratis investment be made for an intensification of capital construction in agriculture for communes and brigades acting as seed propagation bases. Neijiang County has obtained money now from county public finance and from water conservancy funds to build some electric irrigation stations. Following summarization of experiences, numerous seed bases have further implemented systems of responsibility, linking the economic benefits of seed propagation to the personal welfare of those persons involved, encouraging them to study technology, to dig into their jobs, and to perform better in their work of propagating superior varieties.

## ANIMAL HUSBANDRY, WATER CONSERVANCY PLANS DISCUSSED

Chengdu SICHUAN RIBAO in Chinese 16 Aug 80 p 2

[Article: "Do a Good Job of Water Conservancy Construction in Three Zhou's Adapting Methods to Locales"]

[Text] Pasturelands covering an area of 300,000 square kilometers in 45 counties in the three Zhou's of Aba, Ganzi, and Liangshan amount to more than half the area of Sichuan Province. The large tracts of meadowlands in this area plus the grasslands that are used partly for agriculture and partly for pasturage total more than 200 million mu of useable grasslands, or twice the area of cultivated land in the entire province. Here the climate, the quantity of rainfall, and the soil are all better than on the grasslands of North China. More than half of the prairie is covered with superior quality grasslands, amounting to about one-fifth the national total. Nevertheless, the livestock industry has not developed rapidly here for a long period of time. The speed of increase in livestock animals lags far behind that of the prefectures in the provinces where a good job has been done. A major reason for this state of affairs lies in poor capital construction of the grasslands, with a resulting lack of water conservancy facilities, weakness in ability to combat calamities, insufficient water and grass, and few changes in the conditions of production. Pertinent statistical data show that the six purely pastoral counties of Sichuan Province average only 1 li [0.666 square meters] of irrigated forage grass per head of livestock, and for every million mu of grassland, there are only five small-scale water conservancy problems. In Ruergai and Hongyuan counties in Aba Zhou, where a 10,000-mu range was built, the quantity of grass produced was increased two or three fold by solving the drainage and irrigation problems. This shows that the adaptation of methods to local situations to actively initiate water conservancy construction in pastoral areas is extremely pertinent to the development of a livestock industry in the three Zhou's.

In order to do a good job of water conservancy construction in pastoral areas, it is necessary, first of all, to solve the conceptual problem of the livestock industry being an important integral part of agriculture, not only correcting the erroneous view that to give attention to agriculture means only giving attention to grain, but also correcting the erroneous way of doing things whereby the pastoral areas are also required to be self-sufficient in grain. As a result of the influence of the extreme leftist line of Lin Biao and the "gang of four," with its lopsided notion of "grain as the key link," the livestock industry was not given serious attention for a fairly long time in the past; as a result,

water conservancy projects in pastoral areas did not attract serious attention. Water conservancy facilities already constructed in the three shous are in agricultural areas for the most part, while large tracts of grasslands that might otherwise be used have not been put to fullest use for lack of water or a shortage of water. In the grasslands that are being utilized, a gradual regression in the grasslands has gradually taken place as a result of the excessive cutting of forests in recent years, with attendant soil erosion, and the destruction of the ecological balance. In many places today there still exists the backward situation of "relying on the heavens to provide for the livestock, and moving from place to place in search of water." Even more serious has been the requirement for some time that pastoral areas be self-sufficient in grain production with some saying, "herdsmen should not eat grain with a guilty conscience," and diverting pastoral areas to blind cultivation, getting rid of the grass to grow grain. This has resulted in the crowding of herding by agriculture with the destruction of the grasslands. Unless the lessons of experience are summarized, the pernicious influence of Lin Biao and the "gang of four" purged, and a common understanding reached, a good job cannot be done on water conservancy construction for the pastoral areas.

There are very great differences in the geographical locations of pastoral areas in the three shous, which may be divided into three broad regions: the high mountain region, the semi-high mountain region, the hilly, plains, and low-lying region, and the mountain forest grasslands. The situation is different in each region, and construction for water conservancy has to be done in a pragmatic fashion, adapting measures to local circumstances, and adopting measures of various kinds. In view of the present situation, it is necessary, first of all, to solve as soon as possible the problems of drinking water for people and livestock and the shortage of water on the waterless grasslands. There are more than 8.5 million mu of grasslands without water in the pastoral regions, and in some areas, drinking water for a population of almost 280,000 and for more than 500,000 head of livestock is a very difficult problem. These areas are all fairly high districts located along mountain slopes, which are distant from rivers, and some of them are flatlands at high elevations above sea level where because of lack of water or because of drought, or serious rodent damage or damage caused by insects, the output of grass is low, and the livestock are "fat in the fall, thin in winter, and dead in spring." Such areas should make fullest use of ground water and, to the fullest extent possible, divert and store water from springs and mountain streams to bring about constant storage and careful use of water and gravity irrigation. In places where water resources of any kind are truly lacking, arrangements should be made to sink wells for the development of underground water while at the same time readying irrigation works in an integrated system. Secondly, it is necessary to give strict attention to the transformation of marshy meadowlands. There are more than 22 million mu of marshlands in the pastoral regions. Except for some where the draining of water would be difficult, the others are generally located in alluvial areas on the banks of wide ditches or streams where the topography is flat. At Reerdaba and Tangdiandaba in Ruergai County and at Rigendaba in Hongyuan County, for example, the marshes cover an area of from 500,000 to 1 million mu or more. Since the area is covered with water year round, not only are there very few types of grass, but the quality of the grass is poor and output is low. Furthermore, there are numerous parasitical insects there, which pose a great threat to the growth

of the livestock. Since the area of marshy grasslands is large, its transformation must begin by doing what is easy, leaving the more difficult until later, with a small investment and small expenditure of labor at first on projects that show quick results. In Hongyuan County in Aba Zhou, the crisscrossing of drainage ditches in a checkerboard pattern plus tier upon tier of terracing to lower the water table has shown excellent results, and now 700,000 mu of transformed marshy meadowland is largely being used for the grazing of cattle. Third should be active development of small hydroelectric stations. Sichuan Province has hydroelectric power reserves amounting to 150 million kilowatts, of which half of the capacity for development is located in the three zhous. Though small hydroelectric power stations have developed very rapidly during the past several years, the development has been extremely unbalanced. At the present time, the 14 counties without electricity are all concentrated in the three zhous, and the lack of electricity in pastoral regions is even more pronounced. Were small hydroelectric stations to be set up in the pastoral areas, not only could electric power be used for irrigation, but it would provide many advantages in the development of commune and production brigade enterprises, processing of livestock products, and for home illumination. The speed of development should be hastened following the principle of small-scale, dispersed, and electricity generated in a place for the supply of that place. Fourth should be fullest advantage taken of existing water conservancy facilities. Water conservancy projects and hydroelectric stations of various kinds have already been built in almost 10,000 places in the pastoral areas, and the management of these projects should be strengthened; they should be renovated and improved upon; they should be completely integrated; and they should be used in a comprehensive way to derive maximum economic benefit from the projects. Additionally, advanced experiences in the scientific and sensible use of water for the protection of grasslands and for the improvement of grasslands should be promoted.

The three zhous constitute a vast area with scant population where the building of projects is quite arduous, and where local financial and material resources are limited. Consequently, to do a good job of water conservancy construction in the pastoral areas means getting support and assistance from every quarter. An urgent matter of the moment is to help the pastoral areas formulate an effective and workable short-term plan and a long-range tentative plan for the future, and to give attention to the small hydroelectric power stations, to the drainage of water, the sinking of wells, and to the spray irrigation test sites now being newly built. The short-term plan requires that every item be implemented, that main points be taken in hand, and that work be phased in a striving for economic results. In every county of the pastoral region of the three zhous, technical forces for water conservancy and hydroelectric power are extremely weak. Those in charge should request that provincial and prefectural water conservancy and hydroelectric power schools operate classes of various kinds to train personnel from the three zhous in surveying, designing, construction, and management. Henceforth, a certain number of graduates of special technical schools and universities should be assigned to the three zhous for work. For major projects, the provincial authorities concerned should organize technical forces to provide help. They should also look after the equipment, materials and capital needs of the three zhous for water conservancy construction, and subsidies given for project costs should be somewhat higher than in the interior of the country. Priority should be given supply of complete sets of the principal machines and appurtenances needed for the building of electric power stations in the three zhous.

Additionally, simultaneously with the construction of water conservancy projects in the pastoral areas should be more vigorous efforts toward the planting of trees to create forests. The overcutting of forests in the three shous has brought about a great decline in the vegetation cover, and the quantity of rainfall has declined each year, causing a retreat of the grasslands, which poses a major threat to the output of the livestock industry. A good job of planting trees to create forests must be done so that forests will burgeon and grass will be abundant to promote a great development of livestock.

9432

CSO: 4007

## VEGETABLE PRODUCTION, SUPPLY PROBLEMS DISCUSSED

Tianjin TIANJIN RIBAO in Chinese 18 Aug 80 p 2

[Article by Han Qingyun [7281 7230 0061]: "Output, Variety, and Balance-- A Discussion of Three Problems in Vegetable Production and Supply in Our Municipality"]

[Text] Insufficient vegetable production is the main reason for the shortage in the supply of fresh vegetables in our municipality. More than 210,000 mu of land are currently devoted to the production of vegetables in Tianjin, a nearly three fold increase over the 1950's, but output per unit of area has declined by from 30 to 50 percent over the 1950's. Formerly it was commonplace to harvest 10,000 jin of tomatoes from a mu of land, but now getting 5000 jin is a feat. There are many reasons for the decline. One is that the longer the old gardens are farmed, the fewer they become; and the longer the new gardens are farmed, the less fertile they become. Some of the close-in suburbs that produced vegetables most prolifically have long since been made a part of the city, and the new gardens are cropped and rotated with crops with no interval for preparing the soil being given the fields. Year after year the gardens lack capital improvements. Second is a serious insufficiency of organic fertilizer. During the 1950's, each mu received about 5 cubic meters of high grade manure supplemented with cake fertilizer. Nowadays less than 1 cubic meter of manure is given, and most of that is low quality sewage, slag, and garbage. As a result of the large amounts of chemical fertilizers used, the soil has become hard and its natural fertility has regressed. Third is a decline in the level of horticultural skills. Farming is done crudely, and as a result the crops are in their seedling stage for a long time, their growth is slow, and they produce little. Formerly, numerous kinds of eggplant were harvested including genqie [2704 5401], menqie [7024 5401], Simendou [0934 7024 2435], bamianfeng [360 7240 7364] and mantianxing [3341 1131 2502]. Now only menqie is generally harvested and output is scant. Therefore, in terms of production, 210,000 mu of gardens have the output of only 140,000 mu in the 1950's, and naturally this does not meet the consumption needs of the populace. Input of labor and fertilizer, and being particular about techniques to increase per unit yields is doubtlessly the basic path toward solving the shortness in supply of fresh vegetables.

fewer and fewer varieties being farmed is another reason for our city's shortage of vegetables. During the 1950's and 1960's, romaine lettuce, piaocai [3903 5475] squash, tagucai [1042 0657 5475], garland chrysanthemum, edible amaranth, swamp cabbage, huzi [3902 1311] gourds, loofa gourds, shedou [5748 6258], Chinese yams,

and gendacai [2704 1129 5475] were often seen in the markets, but they have vanished without trace for many years. I fear many young people do not even know what they taste like. As with the revival of plays, it seems necessary as well to revive the varieties of vegetables that the people like. This would not only enrich the people's diet, it would also widen the selection of vegetables to be purchased, thereby ameliorating the shortage.

Farmers explain that the reason for the many years of interruption in certain varieties of vegetables lies in the unwillingness of commercial units to handle small lots. This is, in fact, not to be able to see the forest for the trees. Numerous varieties themselves constitute a definite quantity. Still another problem with varieties is that communes and production brigades pursue high output varieties for the sake of income, and the result is gluts in the markets and periods when only certain vegetables are available in the markets: now yuan cabbage [0337 4101 5475], now peppers, and now tomatoes, which makes it difficult for the masses to have a selection. Take the case of yuan cabbage, for instance. In order to increase their incomes, vegetable farmers all vie in the cultivation of "baochun," and "Jingfeng No 1," two high-yield, early-maturing varieties. They no longer want to grow "heiye pingtou" [7815 5509 1627 7333], even though the quality of this variety is good, because output is low, and it reaches market late and cannot be sold for a good price. As a result, from the end of May until the end of June, yuan cabbage fills every street and lane, inspiring awe in every beholder. But as soon as July arrives, it vanishes without trace. If planned arrangements could be made for sufficient quantities of "heiye pingtou," there would be yuan cabbage in the markets in July. Of course an effective method would be to adopt economic measures so that vegetable farmers would not sustain a reduction in income as the result of growing "heiye pingtou."

This relates to a balance in the markets and a so-called solution to the "off season shortage and the peak season spoilage" problem. In actual fact, vegetables are not in short supply all the time. There are times when supply exceeds demand and load after load of vegetables that cannot find a market are hauled back to the rural villages to be fed to hogs. An underlying premise of balanced markets is balanced production, and vigorous development of off-season production is the key to bringing about balanced markets. Can one imagine using the vegetables that "go to waste" in the peak season to finance development by vegetable farmers of off-season production? Maintenance of production in early spring through measures to shelter the earth would require a great deal of investment. Take large enclosures constructed of bamboo-framed plastic, for instance, where the cost of constructing per mu runs to 800 yuan. More than 500 yuan would be required as a single expenditure each year. When vegetable farmers balance income against expenditures, they feel that production under shelter will not bring in as much money as open air production. If, however, subsidies were made so that expenditures for costs incurred would decline, and so that benefits would show a striking increase as compared with open air production, the vegetable farmers would be happy to provide vegetables during the off season. As for the off season during the interval between summer and fall, this exists mainly because prices for vegetables are not equitable and so the vegetable farmers would rather wait until after the dog days are over before growing radishes and cabbages, and they have no interest in growing vegetables to relieve the shortage and tide over into fall, because a mu of vegetables that tides over into fall will not bring the income

of a mu of Chinese cabbage. If subsidies were given for economic reasons, the off season would no longer be off. For the sake of solving the monotony of vegetable varieties during the winter season, economic methods could be used to encourage communes and production brigades to undertake vegetable storage, as, for example: heeling in (of celery and lettuce), buried storage (for radishes and zicaitou [4793 5475 7333], frozen storage (of spinach and coriander), and cellar storage (of yuan cabbage and Chinese cabbage), etc.

9432

CSO: 4007

## PUBLICATIONS

### 11. PUBLICATIONS

#### TABLE OF CONTENTS OF 'NONGYE KEJI TONGXUN,' MAY 1980

Beijing NONGYE KEJI TONGXUN [AGRICULTURAL SCIENCE AND TECHNOLOGY NEWSLETTER] in Chinese No 5, 15 May 80 p 40

#### [Text] How to Use the Heterosis of Hybrid Rice

Yan Zhende [7346 2182 1795].....(p 1)

#### New Rice Variety--Xudao No 1

Zhang Duanquan [1728 4551 0356] and Yu Chengzu [0060 2110 4371].....(p 2)

#### Going a Step Further in the Farming of Hybrid Rice

Lou Xizhi [1236 1585 4363].....(p 3)

#### Paddy Ricefield Baking Technique

Lin Xianmin [2651 0341 3046] and Liu Jinyu [0491 6651 3768].....(p 4)

#### Water Management Methods and Growth of Early Rice

Zhongtong Commune Agricultural Institute, Yujiang County, Jiangsi Province...(p 5)

#### Drip Irrigation To Combat Hot Dry Winds on Wheat

Yunchen Prefecture Meteorology Institute, Shanxi Province.....(p 6)

#### What Can Be Done When Wheat Lodges?

Meng Dexian [1322 1795 2009].....(p 7)

#### C-1 Type Wheat Stem Strength-Measuring Device

Sun Minggui [13270682 2710].....(p 8)

#### Three Heatings and Airtight Storage of Wheat

Han Yuyin [7281 3768 0603] and Wang Junjie [3769 0193 2638].....(p 9)

|                                                                                                                     |        |
|---------------------------------------------------------------------------------------------------------------------|--------|
| Introducing Several New High-Protein Wheat Sources                                                                  |        |
| Biology, Physiology, and Heredity Laboratory, Variety Resources<br>Institute, Chinese Agricultural Academy.....     | (p 9)  |
| Isolated Inbreeding of Corn                                                                                         |        |
| Jiang Xingcun [5592 5281 6722].....                                                                                 | (p 10) |
| Detasseling of Alternate Rows and Human Pollination                                                                 |        |
| Hu Changchuan [5170 2490 1557] and Li Jingxian [2621 4544 0341].....                                                | (p 11) |
| Green Covering for Striking Increases in Corn Output                                                                |        |
| Zhu Yuqing [4281 0151 1987].....                                                                                    | (p 11) |
| Reasons for Increased Output From Intercropping of Wheat With Corn on<br>"2-4 Plots," and Management Measures       |        |
| Guo Zhenxing [6753 2182 5281] and Wang Yuejuan [3769 2588 1227].....                                                | (p 12) |
| Spraying Gaoliang To Create Dwarfing and Strengthening                                                              |        |
| Funing County Scientific Committee Corn and Gaoliang Unit For the<br>Coordination of Key Tasks, Hebei Province..... | (p 13) |
| Japanese Farming Techniques for Sweet Peppers and Eggplant                                                          |        |
| Zhang Huan [1728 3883].....                                                                                         | (p 14) |
| Farming in 1979 With Plastic Sheeting Ground Cover                                                                  |        |
| Vegetable Research Institute, Chinese Agricultural Academy.....                                                     | (p 15) |
| Farming Techniques for Rotational Cropping of Cereal Grains and Cotton<br>in North China Cotton-Growing Areas       |        |
| Lu Xuhua [7120 4872 5478].....                                                                                      | (p 17) |
| High-Density Chemical Weeding of Cotton Without Cultivating                                                         |        |
| Zhu Linyuan [4281 2651 0337] and Wang Guoying [3769 0948 5391].....                                                 | (p 18) |
| Fertilizer Application Techniques for Sesame                                                                        |        |
| Zhong Nai [6988 0035] and Wang Yishou [3769 4448 2392].....                                                         | (p 21) |
| Sesame Variety--Yiyangbai                                                                                           |        |
| Chen Hexing [7115 4395 7881].....                                                                                   | (p 21) |

|                                                                                                          |        |
|----------------------------------------------------------------------------------------------------------|--------|
| <b>Leaf Clipping of Sugarcane for Increased Output</b>                                                   |        |
| Liao Lianan [1675 6647 1344].....                                                                        | (p 30) |
| <b>Increasing Quality and Output of Hemp</b>                                                             |        |
| Chen Fuling [7115 4395 7881] and Mao Jingsheng [3029 2529 0524].....                                     | (p 4)  |
| <b>High First-Year Rice Outout From Newly Cultivated Laterite</b>                                        |        |
| Lin Zhilin [2651 0037 7207].....                                                                         | (p 22) |
| <b>How To Take Care of Chemical Fertilizer</b>                                                           |        |
| Zhou Yanqing [0719 5888 1987].....                                                                       | (p 23) |
| <b>Rational Fertilizer Use</b>                                                                           |        |
| Xu Huandou [1776 3562 2435].....                                                                         | (p 24) |
| Major and Secondary Components of Fertilizer.....                                                        | (p 24) |
| <b>Handy Means of Protecting Root Nodules</b>                                                            |        |
| Biological Nitrogen Fixation Unit, Soil Fertility Institute,<br>Chinese Agricultural Academy.....        | (p 25) |
| <b>Intercropping of Cereal Grains With Chengma [2906 7802]</b>                                           |        |
| Ling Chenghan [0407 6134 3352].....                                                                      | (p 25) |
| <b>Applying Fertilizer Elsewhere Than at the Roots</b>                                                   |        |
| Wu Naiyueh [0702 0035 6460].....                                                                         | (p 26) |
| <b>Cereal Grain Aphids</b>                                                                               |        |
| Zhang Zhili [1728 5347 0448].....                                                                        | (p 27) |
| <b>Keeping Chickens To Control Cotton Weevils</b>                                                        |        |
| Liu Zhongyu [0491 1813 3768].....                                                                        | (p 28) |
| <b>How Much Effect Do Rush Harvesting and Rush Planting Have on Striped<br/>Rice Borers?</b>             |        |
| Liu Ruoshu [04915387 2579].....                                                                          | (p 29) |
| <b>Good Effectiveness in Controlling Armyworms by Using Dichloro-Benzene</b><br>Mijuzhi [5721 0547 7927] |        |
| Armyworm Unit, Jinzhou Municipal Agricultural Institute, Liaoning.....                                   | (p 29) |

Refitting the Three-Hole Spray Nozzle To Control Diseases and Insect  
Pests on the Tops of Plants

Lai Ming [7120 2494].....(p 30)

Broadcasting Highly Effective Insecticide, Furan Powder

Mo Yushi [5459 4416 6108].....(p 31)

*Carpocina nipponensis* and Its Control

Hu Jie [5170 2638].....(p 32)

Saline and Alkaline Tolerant Fodder Crop--Yangu [4354 4474]

Wang Peizheng [6392 0160 6927].....(p 33)

Garlic Juice Injections for Control of White Diarrhea in Swine

Chen Zhuyong [6392 5289 3057] and Liu Changxi [0491 7022 6007].....(p 33)

A New System for the Delivery of Young on Pig Farms

Zhang Qingzhi [8369 1987 1102].....(p 34)

Preliminary Diagnosis of Erythroblastosis Fetalis in Mule Foals

Lin Suonxiao [0491 1957 0208] and Lu Shucheng [7120 2885 2052].....(p 35)

Handy Facilities for the Feeding of Adult Silkworms

Guang Shiqing [7806 1102 0615].....(p 36)

How High Is America's Corn Output? New Method for the Inoculation of  
European Corn Borers Into Corn. Biological Control of Locusts. (p 38)

Syrian Irrigation Techniques (p 39)

Chairman Hua Guofeng Shakes Hands With Jin Shanbao [6855 0815 1405], Wheat Breeding  
Expert and Director of the Chinese Agricultural Academy. Photo by XINHUASHE cor-  
respondent Liu Shaoshan [0491 1421 1472] (Front Cover)

Geniale Hua Guofeng, at a Discussion Meeting With Agricultural Scientists. Photo by  
XINHUASHE correspondents Liu Shaoshan and Cui Baolin [1508 1405 2651] (Inside Front  
Cover)

"Handy Facilities For Feeding Adult Silkworms." Illustration (Inside Rear Cover)

"Japanese Farming Techniques for Green Peppers and Eggplants." Illustration (Rear  
Cover)

9432  
CSO: 4007

## Genetics

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TITLE: "An Investigation on Nucleohistones from Three Lines and Their  $F_1$  Hybrid in Rice"

SOURCE: Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese No 3, Sep 80  
pp 208-214

TEXT OF ENGLISH ABSTRACT: This paper presents the results of an investigation on the electrophoretic analysis of nucleohistones isolated from rice seedlings of three lines and their  $F_1$ . Comparing the histones of the three lines and their  $F_1$  with those of calf thymus, wheat and rice cultivar 192, we found that the rice histones exhibited the same electrophoretic mobility as that of wheat. The electrophoretic mobility and number of H1 histones were highly variable in the species investigated. This revealed that there is no distinct difference in the histones of the three lines. The content of the hybrid H1 histone, however, was higher than the parental H1 content. The fact that the H1 content of  $F_1$  exceeds its parents may be related to the expression of heterosis.

\* The "three lines" here denote male sterile line (V20A), its maintainer line (V20B) and restoring line (IR26). Their  $F_1$  is shown by Vyou 6.

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TITLE: "A Diallel Analysis of Some Quantitative Characteristics in Chinese Head Cabbage (Brassica campestris L. ssp. Pekinensis (Lour.) Oison)"

SOURCE: Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese No 3, Sep 80  
pp 215-222

TEXT OF ENGLISH ABSTRACT: Forty-nine diallel cross  $F_1$  combinations of seven parental lines have been used to estimate the g.c.a., s.c.a., reciprocal effect, sexual effect, nonsexual effect and their variance components of seven quantitative characteristics together with their heritabilities and correlation coefficients, and their possible selective effects are discussed.

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TITLE: "Isozymic Studies on the Origin of Cultivated Corn"

SOURCE: Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese No 3, Sep 80  
pp 223-230

TEXT OF ENGLISH ABSTRACT: The present paper intends to present the results obtained on this problem by means of isozymes. Seventy-eight varieties and inbred lines were used for the experiment, 42 of them introduced from various provinces of China and 36 from different countries in America. Peroxidases and esterases were detected from the extracts of leaves and endosperm. Two species of Teosinte and Tripsacum were taken to be the standard types of corn of American origin and two species from the genus Coix were taken to be South Asian corn.

Results obtained from the detection of peroxidases showed that 59.5 percent of the varieties from South Asia presented a V band of isozymes and 55.6 percent of those from America presented a IV band. Another feature was shown as we took the viewpoint of differences between subspecies. Of the 19 dent corn from America, 16 indicated IV band (84.2 percent) and of the 11 wax varieties from southern

[Continuation of YICHUAN XUEBAO No 3, Sep 80 pp 223-230]

provinces of China, 10 indicated V band (90.9 percent). This might be attached to the influence of hybridization that occurs frequently and easily between different varieties and subspecies. It is interesting to see that Coix also showed the same V band as did the varieties from China, but zymograms of Teosinte and Tripsacum were different from those of American varieties. All of this indicates the possibility of a South Asian origin of cultivated corn.

Zymograms of esterase showed no regularity in differences between two geographical groups of cultivated corn.

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TITLE: "Use of Three Line Combination for Production of Genetic All-Male Tilapia mossambica"

SOURCE: Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese No 3, Sep 80 pp 241-246

TEXT OF ENGLISH ABSTRACT: This paper presents a report on the artificial control of genetic all-males in T. mossambica. Our experiments indicate that through the approach of three line combination for artificial control of sex, we have attained

[Continuation of YICHUAN XUEBAO No 3, Sep 80 pp 241-246]

100 percent sons (XY) in T. mossambica and that the combination among three line of prime line (XY), male homozygous line (YY) and male homozygous reversal line (YY) is the key to production technique.

A comparison of approaches between the sex control of genetic males and that of physiological males was carried out.

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TITLE: "A Preliminary study on the Parthenogenesis in Cotton (Gossypium hirsutum)"

SOURCE: Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese No 3, Sep 80 pp 247-256

TEXT OF ENGLISH ABSTRACT: Parthenogenesis induction is one of the methods of plant haploid breeding. So far it has not been reported for the isolated anther or ovule formed plantlet. In this experiment, both the ovary and the ovule of cotton have been treated by chemical drugs to induce the ovule to produce artificial parthenogenesis on the maternal plant.

Two hybrids were used as materials in this test: one is  $F_1$  of Liao 5 x Shensi 3245 and the other is  $F_2$  of (632-128 x Mexico 910) x N75. We treated the flower buds. The age of these flower buds is from six days after the bud's appearance to one day before the flower opens, and they were treated with colchicine, dimethyl sulfoxide and petroleum growth promoting substance of different concentrations and combinations. Four hundred thirty-five flower buds have been treated, of which 102 achieved parthenogenesis bolls. In these parthenogenesis bolls, among these seeds some are undeveloped, some are semi-developed, while others are completely developed. Only the complete seeds may germinate. This test showed that when the

[Continuation of YICHUAN XUEBAO No 3, Sep 80 pp 247-256]

Flower buds appeared after 16-21 days and the ratio of the length of the calyx and the corolla was 7.6:4.0 mm - 8.5:9.5 mm, the effect of treatment by 0.2 percent dimethyl sulfoxide + 0.2 percent colchicine was the most pronounced, the frequency of the seed formation in the parthenogenesis boll being higher. In this paper, the accuracy of these bolls derived from artificial parthenogenesis and the problem of the bolls' abscission have also been discussed.

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TITLE: "Preliminary Observations on the Inheritance of Frond Thickness in Laminaria japonica"

SOURCE: Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese No 3, Sep 80 pp 257-262

TEXT OF ENGLISH ABSTRACT: The brown alga Laminaria japonica is an important seaweed widely cultivated in China. The inheritance of its frond length and width has been studied. This paper discusses only the inheritance of the frond thickness.

According to our observation, the development of the frond thickness is influenced by many environmental and genetic factors. Evidence collected shows that the frond thickness is a genetic characteristic. First, the frond thickness shows a positive correlation of  $r = 0.820$  between the parent and the offspring in our experiment. Second, the frond thickness of breed  $H_3$  was observed to be significantly greater than that of breed  $H_4$  for four successive years. The frond thickness

[Continuation of YICHUAN XUEBAO No 3, Sep 80 pp 257-262]

was found to be a quantitative characteristic showing a continuous variation. Multi-factors were believed to control the growth of the frond thickness. The genetic factors were suspected to act on the cell size and the number of cellular layers in the cortex of the frond. The thick-frond breed  $H_3$  possesses six cell layers more than does the thin-frond breed  $H_4$ . Observations on the early growth of the germings show that the genetic factors seem to begin to act in the young sporophytes of about 2-4 mm long.

As the natural population of this seaweed was found to be very heterozygous in genetic content, various inbred lines or breeds with different frond thicknesses can be obtained by intensive inbreeding and vigorous selection.

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TITLE: "Preliminary Report on Test-Tube Fertilization of Tobacco and Wheat"

SOURCE: Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese No 3, Sep 80  
pp 263-267

TEXT OF ENGLISH ABSTRACT: Recently we have succeeded in studying test-tube fertilization in ovule cultures of tobacco and in vitro pollination in pistil cultures of wheat. The results are presented as follows:

(1) The unfertilized ovules with placenta of tobacco were placed on Nitsch's medium, on which was deposited the sterilized pollen. As a result, the seeds and seedlings in intervarietal cross of Nicotiana tabacum and interspecific cross of N. tabacum x N. rustica and N. tabacum x N. glauca were obtained. The presence of stigma and style could remarkably promote the positive effect of test-tube fertilization.

(2) The unpollinated pistil of wheat was placed on the MS medium in test tubes. Application of sterilized pollen to the stigma resulted in seed set of 1.9 - 7.1 percent. The embryos and seeds could normally germinate and produce mature plants.

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TITLE: "Observation on the Giemsa C-Bands and Somatic Association of the Chromosomes in Cultivated Paeonia"

SOURCE: Beijing YICHUAN XUEBAO [ACTA GENETICA SINICA] in Chinese No 3, Sep 80  
pp 271-275

TEXT OF ENGLISH ABSTRACT: By observing the chromosome patterns of three cultivars of Paeonia with Giemsa C-banding technique, it is found that the main difference among them lies in the I and II chromosome C-bands. The number of chromocenters in the interphase nucleus is not constant but variable. These chromocenters remain basically in the anaphase-telophase structure pattern. In addition, it is also found that the percentage of somatic association is 32 percent, and that the percentage of the somatic association of SAT-chromosomes reaches as high as 40 percent.

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Pedology

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TITLE: "Studies on the Moisture Regime in Black Soils in the Northern Part of Northeast China. III. On the Reliability of Water Supply for Crop Growth and the Forecast of Spring Drought in the Region of Black Soils"

SOURCE: Beijing TURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80 pp 203-216

TEXT OF ENGLISH ABSTRACT: The field evaporation process and the annual rate of crop evapo-transpiration in experimental fields under local climatic conditions were calculated by means of an empirical formula. Comparing data obtained with the average rain process and amount of annual rainfall in the same fields, the results of the water balance in black soils under different crops were obtained. Using these results to evaluate the adequate water supply to crops we found that soybeans and corn had a rather good reliability of water supply, but

[Continuation of TURANG XUEBAO No 3, Aug 80 pp 203-216]

that of spring wheat appeared somewhat short and was apt to suffer from drought. The seasonal frozen layer in black soil played an important role in the regulation of the water supply, and the spring thaw in the frozen layer was the main source of water in the earlier stage of plant growth. Factors affecting spring drought were studied and methods of prediction of spring drought were suggested.

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TITLE: "Chloral Pollution and Its Degradation in Soil"

SOURCE: Beijing, FURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80  
pp 217-227

TEXT OF ENGLISH ABSTRACT: The rate of degradation of chloral in soil is in the following order: quickest in salinized meadow soil, next in paddy soil and slow in red soil. In general, when chloral is exposed to the air and light, or is in contact with an alkaline solution, it is liable to rupture at C-C bond and decompose into  $\text{CHCl}_3$ ,  $\text{Cl}_2$ , etc. However, the transformation of chloral in soil proceeds chiefly to the formation of TCA instead of C-C bond rupture. The oxidation products have been identified by the derivative chromatography and by gas chromatography and mass spectrography. The conversion rate of TCA from chloral was about 56-76 percent with a persistent period of 70-100 days.

Experiments showed that microbiological activities played an important role in

[Continuation of FURANG XUEBAO No 3, Aug 80 pp 217-227]

the degradation process. In non-sterized soils, chloral oxidized to TCA quickly with low activation energy (5.8 Kcal/mol), while in sterized soil, the oxidation of chloral was much slower, the activation energy was comparatively high (23 Kcal/mol) and no TCA appeared. In the former case it was largely due to the microbiological mechanism, and in the latter case to the chemical mechanism.

The effect of chloral and its degradation products on wheat was tested in a pot experiment. Chloral and TCA were strongly poisonous to wheat. After the complete disappearance of chloral, the persistence of TCA had a positive correlation with soil pollution.

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TITLE: "Boron-Deficient Soils and Their Distribution in China"

SOURCE: Beijing TURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80  
pp 228-239

EXCERPT FROM ENGLISH ABSTRACT: In the eastern and southern areas of China boron-deficient soils have been found in large areas, while soils in the arid regions are rather rich in boron. The amount of boron in soils varies with parent materials. Soils derived from shale, limestone and marine sediment are usually rich in boron and those derived from granite and other igneous rocks, gneiss and sandstone are low in boron. Strong alkalinity and rich organic matter in soils reduce the availability of soil boron. Thus the boron-deficient soils may be divided into two types and four subtypes.

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TITLE: "The Availability of Nitrogen of Green Manures in Relation to Their Chemical Composition"

SOURCE: Beijing TURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80  
pp 240-246

TEXT OF ENGLISH ABSTRACT: The nitrogen balance and the availability of residual nitrogen of green manures in relation to their chemical composition were studied in pot and incubation experiments. Azolla, milk-vetch and common water hyacinth were used as green manures and labeled by the fertilization of  $(^{15}\text{NH}_4)_2\text{SO}_4$ .

Results obtained are summarized as follows:

1. Although plant materials having lower C/N ratios usually give more available nitrogen and the C/N ratio of azolla was lower than that of milk-vetch, azolla contained high lignin of about 20 percent and consequently the percentage recovery of nitrogen by rice plants from azolla was much lower than that from milk-vetch.

2. The loss of nitrogen from azolla during the growing period of the rice plant was more than that from milk-vetch. This may be due to chemodenitrification.

3. Judging from the nitrogen availability ratio (defined as the percentage of nitrogen originating from plant residues mineralized or absorbed by crops divided by the percentage of soil native nitrogen of the same performances), the residual nitrogen availability of azolla was equal to, or slightly lower than, that of soil native organic nitrogen, while that of milk-vetch and common water hyacinth was usually higher.

It seems that the effect of green manures on the improvement of soil organic matter varied with their chemical compositions. Green manures with higher lignin content usually yielded a lower amount of "active organic matter."

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TITLE: "Nitrogen Cycle in Water Layer of Paddy Field as Affected by the Plantation of Aquatic Plants"

SOURCE: Beijing TURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80 pp 247-254

TEXT OF ENGLISH ABSTRACT: A review on the effect of the plantation of aquatic plants on rice yield conducted by the authors in recent years is given. It is considered that the nitrogen cycle in the water layer is closely related to the nitrogen cycle in the underlying soil layer, and the plantation of aquatic plants in rice fields showed beneficial effects on the nitrogen economy for rice growth. Another aquatic plant, pistia stratiotes, although not possessing the ability to fix nitrogen from the atmosphere, reduced the loss of nitrogen brought in through irrigation water and fertilizers and diffused from the

[Continuation of TURANG XUEBAO No 3, Aug 80 pp 247-254]

underlying soil. The latter effect is quite important in decreasing the loss of fertilizer nitrogen.

Some discussion on the methods of plantation and utilization of pistia stratiotes is also briefly given. In the case where pistia stratiotes was planted during the growing period of early rice and then plowed under as the basal dressing for late rice, the increase in grain yield of the latter averaged 13 percent without markedly affecting the yield of early rice. Pistia stratiotes may be planted in late rice fields and then used as a top-dressing green manure.

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TITLE: "Experiments on the Reclamation of Saline Soils by Well Drainage in the Coastal Areas of Shandong Province"

SOURCE: Beijing TURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80 pp 255-266

EXCERPT FROM ENGLISH ABSTRACT: The present article deals with the reclamation of saline soils in the Dayuzhang district of the coastal areas of Shandong Province. Experiments were laid out in the years 1973-1978. Irrigation water was conducted from the Yellow River. Pumping wells in connection with open

ditches were constructed for drainage. Detailed descriptions and records on the arrangement of drainage systems, seasonal change of water movement in the soil profile, change of salinity of soil water and in soil layers, effect of texture profile of the soil on the rate of drainage and the rate of desalinization of experimental fields were illustrated.

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TITLE: "A Primary Study on the Soil Hydrophilicity"

SOURCE: Beijing TURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80  
pp 267-274

TEXT OF ENGLISH ABSTRACT: The present paper proposes a new characteristic index --the hydrophilicity value of soil (H) for studying soil hydrophilicity, and introduces its measuring method. The H value is defined as a ratio of the volume of water to the volume of CCl<sub>4</sub>, both of which are held by a unit quantity of soils.

The magnitude of the H value was mainly related to the component of clay minerals in soils. The results obtained showed that the H value was in the following descending order: bentonite > kaolinite; chernozem > yellow brown earth and neutral paddy soil > red earth > laterite. The time needed to attain an equilibrium rate of water holding of soils is positively correlated with the magnitude of the H value.

[Continuation of TURANG XUEBAO No 3, Aug 80 pp 267-274]

Removal of organic matter decreased the H value of chernozem, but had no significant influence on H values of Ca-laterite and Ca-paddy soil. Removal of free ferric oxide showed a remarkable effect on Ca-laterite and Ca-paddy soil.

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TITLE: "Studies on the Transformation of Soil Organic Materials. Part I. Transformation of Organic Materials in Relation to the Amelioration of Soda-Saline Soils"

SOURCE: Beijing TURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80 pp 275-283

TEXT OF ENGLISH ABSTRACT: This article deals with the transformation of organic materials and its effect on the properties of soda-saline soils. The results obtained are summarized as follows:

1. Under given hydrothermal conditions, the rate of transformation of organic materials in soda-saline soils as affected by microorganisms is as follows: Bacteria > Actinomycetes > Bacillus > Fungi. Azotobacter and cellulose decomposing bacteria multiplied very rapidly in the presence of added plant materials. They

were beneficial in the transformation of organic materials and accumulation of nitrogen.

2. The activities of proteinase were promoted by the application of organic materials in soda-saline soil.

3. Various low molecular organic acids, such as formic, acetic, propionic and butyric acids, can be detected in soda-saline soil. The amount of them varied greatly with the history of cultivation and soil management.

4. The amount of water soluble humus, active humic acid and fulvic acid was higher in soda-saline soils in plots with organic materials treatment than in the control plots. These compounds activated soil cations and improved soil properties.

5. Under given hydrothermal conditions the transformation of organic materials in soil affected the composition of soil microorganisms and the physical and chemical properties of the soil as well. Application of organic materials on soda-saline soils reduced the content of water soluble  $\text{Ca}^{++}$ ,  $\text{Mg}^{++}$ ,  $\text{Na}^+$ ,  $\text{HCO}_3^-$  and  $\text{CO}_3^{--}$ , and increased the available nitrogen, phosphorus and buffer capacity of the soil.

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TITLE: "The Effect of Sodium Humate on the Uptake of Phosphorus from Rock Phosphate by Plants"

SOURCE: Beijing TURANG XUEBAO [ACTA PEDOLOGICA SINICA] in Chinese No 3, Aug 80 pp 284-290

TEXT IN ENGLISH ABSTRACT: The present article reports the effect of humic substances on the availability of rock phosphate to crop growth. Water culture experiments for wheat, tomato and rice were carried out with both ordinary rock phosphate and radioactive rock phosphate as phosphate sources. Experiments showed no evidence that the addition of sodium humate gave beneficial effects on the availability of phosphate from rock phosphate to crop growth. However, the stimulating effect of sodium humate on root growth can be observed in all

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TITLE: "Studies on Resistance of Rice Varieties to the Brown Planthopper"

SOURCE: Tianjin ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3, Sep 80 pp 133-138

TEXT OF ENGLISH ABSTRACT: In this paper the responses of different rice varieties to different biotypes of the brown planthopper Nilaparvata lugens (Stal) are observed. The survival rate, population build up and honeydew excretion of this insect are also studied.

- 1) The responses of different rice varieties to various biotypes are not alike. TN<sub>1</sub> is the most susceptible. Mudgo is susceptible to biotype 2. Both ASD<sub>7</sub> and IR<sub>36</sub> are susceptible to biotype 3, but resistant to biotype 1 and biotype 2. Rathu Heenati, Babawee, 26376 and 25639 are resistant to all biotypes.
- 2) The interactions between the brown planthopper (BPH) and the host plants show that the survival rate of BPH nymphs on the susceptible varieties is significantly greater than that on the resistant varieties. Few nymphs survive on resistant varieties, such as Rathu Heenati, Babawee, 26367 and Ptb<sub>33</sub>. It is noted that the survival rate of biotype 2 is higher on Mudgo and lower on ASD<sub>7</sub>; the reverse is true for biotype 3.

[Continuation of ZHIWU BAOHU XUEBAO No 3, Sep 80 pp 133-138]

The female weight of BPH is heavier on TN<sub>1</sub> than on either ASD<sub>7</sub> or Mudgo. On Mudgo, biotype 2 weighs heavier than biotype 3; on ASD<sub>7</sub> it is just the opposite.

3) The effect of different varieties on nymphal development is shown by the fact that Mudgo supports a larger population of biotype 2, while ASD<sub>7</sub> supports a larger population of biotype 3. The development of the nymph is worse on resistant varieties, such as biotype 2 on ASD<sub>7</sub> or biotype 3 on Mudgo. The TN<sub>1</sub> can support a larger population and has a better development for all biotypes.

4) The population build up of BPH on the susceptible varieties, such as TN<sub>1</sub>, Mudgo (for biotype 2) and ASD<sub>7</sub> (for biotype 3), is significantly higher than that on the resistant varieties. The susceptible varieties can support a larger population.

5) The heaviest honeydew is excreted by the BPH biotype fed on the susceptible varieties, such as TN<sub>1</sub>, Mudgo (for biotype 2), or ASD<sub>7</sub> (for biotype 3). The area (mm<sup>2</sup>) or color intensity (mm) of honeydew responses by ninhydrin on the susceptible varieties is greater than that on the resistant ones.

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TITLE: "Studies on the Biology of the Diamondback Moth: Observations on Behavior"

SOURCE: Tianjin ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3, Sep 80 pp 139-144

EXCERPT FROM ENGLISH ABSTRACT: In conjunction with studies made on the life history of the diamondback moth, Plutella xylostella L., in Hangzhou, 1973-1974, a series of observations were made on the behavior of the larvae and adults, both in the laboratory and outdoors.

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TITLE: "On the Problem of Cotton Insect Pests on Hainan Island and the Integrated Control Program Against Them"

SOURCE: Tianjin ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3, Sep 80 pp 145-152

TEXT OF ENGLISH ABSTRACT: The occurrence, distribution and damage caused by 55 species of cotton insects on Hainan Island are recorded. According to natural conditions of Hainan Island, three cotton growing districts of Qiongzhan, Dongfang and YA County are classified as cotton agricultural ecosystems.

A general survey is made on the above three growing districts and the occurrence of the major cotton insect pests. There are various reasons for the fluctuations of cotton insects on the island, chiefly: 1) change of various climatic factors, 2) change of the geographical environments, including results due to agricultural practices. Discussions are made on the following factors, such as climate, cultural practices, alternate hosts, natural enemies and chemical control, as well as the relationship between such factors and insect populations. An integrated control program is proposed based on the analysis of the natural conditions and the occurrence of the insect populations.

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TITLE: "Improved Technique for Mass Rearing of Rice Moth"

SOURCE: Tianjin ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3, Sep 80 pp 153-158

TEXT OF ENGLISH ABSTRACT: Eggs of the rice moth, Corcyra cephalonica, have been used in the mass production of Trichogramma spp. and Chrysopa spp. Some improvements in the mass rearing technique of the rice moth are reported in this paper.

When wheat bran mixtures in trays were used as larval food and infested directly with moth eggs, 11-24 percent more moths were produced than using the previous technique in which a small portion of the wheat bran mixture was first infested in a glass jar and 10 days later the developing larvae were transferred to and reared in trays. Thirty-one percent more moths were produced when the moth eggs were increased from 3,000 to 4,000 per kg of food. Covering the eggs with a thin layer of food after infestation was found to produce 14.5 percent more moths than did not covering them. Rearing rice moths in trays with larval food containing 90 percent

[Continuation of ZHIWU BAOHU XUEBAO No 3, Sep 80 pp 153-158]

wheat bran and 10 percent wheat flour (or flour of corn, sorghum, sweet potato) or 5 percent flour and 5 percent ground soybean cake obtained the following results: rate of adult emergence 56-62 percent, percentage of female moths 54-60 percent, eggs deposited per female 126-141, number of moths obtained per kg of food 1,692-1,880, number of eggs obtained per kg of food 130,000-148,000.

The various bran mixtures used in rearing rice moths not only affected the production of the moths, but also the sex ratio, egg production per female and rate of development. Thus the total number of eggs obtained per kg of food used in rearing has been accepted as a better criterion in the evaluation of the different foods.

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TITLE: "Studies on the Interior Seed Borne Verticillium of Cotton"

SOURCE: Tianjin ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3, Sep '80 pp 159-164

TEXT OF ENGLISH ABSTRACT: In 1964-1966, we isolated 11,505 seeds from well-developed, but not yet dehiscent, cotton bolls near the lower main axis which were severely infected by Verticillium. The rate of interior seed borne Verticillium for three years was <0.026 percent on the average. Isolating each part of the above bolls systematically, the comparative rate carrying the fungus was: boll stipes > boll receptacles > placentas.

Concerning the interior seed borne Verticillium in the dehiscent bolls, the following results were obtained: From 1,557 matured seeds with about 5 percent exterior (lint) seed borne Verticillium collected from Liaoning Province in 1964, no micro-sclerotia colonies were obtained. In 1966, 4,049 matured seeds were collected strictly from the dehiscent bolls in Beijing and isolated; only one delinted and under-developed seed gave a micro-sclerotial colony, the percentage of interior

[Continuation of ZHIWU BAOHU XUEBAO No 3, Sep 80 pp 159-164]

seed borne fungus being 0.025 percent.

By artificial field inoculation with concentrated Verticillium spore suspension to the cavity of bolls just beginning to dehisce, it was found that the intensity of interior seed borne fungus of Verticillium was around 0.9-2.4 percent. By inoculation with the same spore suspension to the unripened bolls, we obtained rates of interior seed borne Verticillium as high as 10.4-70.4 percent. By spraying the inoculation and then covering the bolls to maintain the humidity for one to two days for the newly opening bolls, no interior seed borne fungus was found after isolation. These experiments indicate that in cases of sufficient inoculum under conditions of optimum nutrition, temperature and humidity, the invasion of the pathogen, not through the vascular bundles, was able to induce a high percentage of interior seed borne fungus.

According to the results of these experiments it was concluded that the pathogen of Verticillium wilt under natural conditions mainly attaches to the lints of cotton seeds. The percentage of interior seed borne Verticillium is very low. The cotton seeds as collected from the normally dehiscent bolls on healthy or slightly diseased plants were basically internally free from the pathogen of Verticillium wilt.

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TITLE: "Studies on the Cotton Wilt Caused by Fusarium oxysporum F. vasinfectum and Its Control"

SOURCE: Tianjin ZHILU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3, Sep 80 pp 165-170

TEXT OF ENGLISH ABSTRACT: The incidence of cotton wilt in the vicinity of Beijing generally reaches 10-30 percent and in certain cases up to 50 percent. In field observations it was found that the disease began to appear when the average temperature rose to 20°C, reached its peak at about 24°C and began to decrease when the temperature rose above 28°C. The cotton plants were infected throughout the growth period, however, with the most abundant disease development occurring at the time of boll formation. When the infested soil was in the presence of an unidentified nematode, the disease incidence was significantly increased. In the field plot where only Fusarium culture was inoculated, the percentage of diseased plants was 31.5 percent. However, when both the Fusarium culture and the nematodes were inoculated, the percentage of infection increased up to 65.6 percent. It was determined

[Continuation of ZHILU BAOHU XUEBAO No 3, Sep 80 pp 165-170]

That the cotton variety Shaan 721 was highly resistant to the Fusarium wilt with disease indices 0.6-4.8, while the susceptible control variety Xuzhou 1818 showed disease indices of 31.5-35.4. Treating the infested soil with nematocides in mixture with fungicides resulted in the most satisfactory control. A practice of a three to four year crop rotation of cotton with wheat, corn or paddy rice reduced the disease incidence nearly 95 percent.

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Title: "Study of Method for Detecting Cotton Seed Borne Fusarium Wilt Fungus"

Journal: ZHONGGUO ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3, Sep 80 pp 171-176

TEXT OF ENGLISH ABSTRACT: Cotton seeds are agents for long distance dissemination of cotton wilt. The seed borne rate of Fusarium wilt is about 0.01 percent to 46.8 percent. The pathogens attack the seed-coat, cotyledon and embryo. Among the seed-borne fungi, Fusarium semitectum B. & R., F. equiseti (Carda) Sacc., F. moniliforme Shel., F. solani (mart.) Sacc. and others, may be isolated. These isolates usually indicate the detection of F. oxysporum f. sp. A selective medium for examining the cotton seed was formulated. It is composed of 1 g methyl cellulose, 1 g  $KH_2PO_4$ , 5 g peptone, 0.5 g  $MgSO_4 \cdot 7H_2O$ , 0.2 g  $K_2S_2O_5$ , 0.6 g KCl, 0.3 g  $NH_4NO_3$ , 0.1 g pentachloronitrobenzene, 20 g sucrose, 0.1 g streptomycin sulfate, 20 g agar, 1,000 ml distilled water. This medium has successfully been used on detecting cotton wilt fungus according to the selective differential pigment and

[Continuation of ZHIWU BAOHU XUEBAO No 3, Sep 80 pp 171-176]

Morphological characteristics of the colony of Fusarium oxysporum f. sp. vasinfectum.

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TITLE: "Study of Witches' Broom on Paulownia"

SOURCE: Tianjin ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3, Sep 80 pp 177-182

TEXT OF ENGLISH ABSTRACT: Witches' broom on Paulownia is one of the most serious diseases in China. In heavily infected affected areas, more than 80 percent of the cultivated trees were infected. Axillary buds proliferate and produce many secondary and tertiary shoots which are covered with small yellow leaves. The flowers become phylloid. Branches and shoots of infected trees usually showed dieback in the current year which may have affected its growth rate in the following years.

Typical symptoms appear on a healthy seedling when graft-inoculation with diseased barks is carried out. Mycoplasma-like bodies could be seen in the several elements of phloem tissue under electron microscope. The unit-membrane of MLO is 10 nm thick and 200-820 nm in diameter. It is spherical and ellipsoidal. Most of the seedlings derived from the diseased root-cutting are able to produce witches' broom. The disease could not be transmitted by sap inoculation or through seed.

Diseased root-cuttings should be dipped in hot water between 40°C and 50°C for

[Continuation of ZHIWU BAOHU XUEBAO No 3, Sep 80 pp 177-182]

30 minutes, or in 1000 ppm tetracycline in water before planting. These methods can effectively control the disease for several years. An injection of 10,000 ppm of tetracycline in water or 5 percent sodium borate into the diseased trunk or soaking its root will reduce the development of the disease to some extent.

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TITLE: "Occurrence and Diminishing Law of Major Field Weeds in Shanghai"

SOURCE: Tianjin ZHIWU BAOHU XUEBAO [ACTA PHYTOPHYLACTICA SINICA] in Chinese No 3,  
Sep 80 pp 183-190

TEXT OF ENGLISH ABSTRACT: During 1972-1979, we made some investigations and studies on the biological and ecological characteristics of the main field weeds in Shanghai. After surveying the natural occurrence of 189 kinds of main field weeds, the following four occurring types are suggested: the early spring type, spring-summer type, autumn-winter type and spring-autumn type, with Chenopodium album L., Digitaria sanguinalis (L.) Scop. and Echinochloa crus-galli (L.) Beauv., Alopecurus aequalis Sobol., as well as Chenopodium serotinum L., as their representatives respectively. At the same time, we made it clear that in different years, under different crops and cultivation conditions, as a result of variation in environmental conditions, there remain some differences in the occurrence of weeds. Grasping the law of the occurrence of weeds and the characteristics of their growth and development, we are able to provide certain theoretical evidence for the control of weeds and for the rational and timely application of herbicides.

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TITLE: "Studies on the Degradation of Dimethoate in Tea Shoots"

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EXCERPTS FROM ENGLISH ABSTRACT: Dimethoate has been widely used for the control of tea pests such as jassids, aphids and thrips, etc. The present paper deals with the studies on the degradation of dimethoate and dimethoxon in tea shoots.

According to the results of the experiment, it is concluded that under natural field conditions, dimethoate degrades moderately on the fresh tea shoots.

The authors recommend that the tolerance residue limits in the tea may be established as 1 ppm (expressed as the sum of dimethoate and dimethoxon). According to this, the residue of dimethoate and dimethoxon in the tea manufactured by tea shoots sprayed with 40 percent dimethoate EC at a dilute of 800 and 1600 may be decreased to less than 1 ppm after 7 days and 5 days after the application. However, due to the taints of dimethoate to the tea, the authors recommend that the

[Continuation of ZHIWU BAOHU XUEBAO No 3, Sep 80 pp 191-196, inside back cover]

safety intervals should be delayed to 7 days (40 percent EC 2000 dilute solution) and 10 days (40 percent EC 1000 dilute solution).

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